

# COAL AGE

With which is consolidated "The Colliery Engineer" and "Mines and Minerals"

Published by McGraw-Hill Publishing Company, Inc.

WILLARD CHEVALIER, Vice-President

## MAY 1937

SYDNEY A. HALE, Editor

R. DAWSON HALL  
LOUIS C. MCCARTHY

IVAN A. GIVEN  
WALTER M. DAKE

J. H. EDWARDS  
PAUL WOOTON

A. W. FISHER, Manager



Drilling, cutting and loading  
At Earl J. Jones mine  
See p. 187

## CONTENTS

Volume 42

No. 5

Mechanized Mining in Heavily Pitching Western Seams ..	183
By THOMAS MURPHY	
Mobile Loaders and Conveyors Yield 9.7 Tons per Man ..	187
By J. H. EDWARDS	
What Cincinnati Convention Offers—An Invitation .....	191
By C. E. COWAN	
Little John Capitalizes on Improved Equipment Design ..	192
By IVAN A. GIVEN	
Safety Principles Cardinal in Operating Program—I .....	195
By J. L. HAMILTON	
All Coal Washed After Crushing at Little John Plant .....	199
Breaker at Glen Lyon Establishes Cleaning Precedents ..	205
By W. E. WEINECK	
Open-Ending Blocks Cuts Costs at W. J. Rainey Mines ..	209
Cincinnati Convention-Exposition Technical Program .....	212
Mobile Dump Provides Flexibility in Refuse Handling .....	214
Guffey-Vinson Coal-Control Bill Passed by Congress .....	225
Miners Granted Increases and Extra Pay for Overtime .....	231

• "Cincinnati, here we come!" will be the cry of thousands when the industry descends upon the Queen City May 17 for the American Mining Congress annual convention and exposition. Chairman Cowan has a special message for all coal men on page 191; the convention-week program is on page 212. As in the past, Coal Age editors will be on hand to report the proceedings for our June Post-Convention Number.

• Three aspects of mechanization are treated this month. Thomas Murphy describes recent advances in conveyor mining in the heavily pitching seams of Washington. How Earl Jones combines mobile loaders and conveyors in trackless mining in Ohio is told by J. H. Edwards. Mechanization as exemplified in the new Little John stripping operation in Illinois is outlined by Ivan A. Given.

• True longwall work is found in few fields in the United States. One is the Centerville (Iowa) district, where Sunshine Coal Co. mines a 30-in. seam. How it is done and how ring-type distribution assures adequate voltage for cutters will be described in an early issue, together with preparation practices and an unusual rescreening and oil-treating plant.

• Outstanding among the newer breaker installations is that at Glen Lyon, which cleans domestic sizes together in two cones, buckwheat and rice in a third, and the two smaller steam sizes in a Hydrotator. Lighting, water and the handling of hybrid and flat coals are among the problems discussed by W. E. Weineck, superintendent, in the article starting on page 205.

• Safe mining is no bar to efficient operation at Republic Steel plants in western Pennsylvania, which produced nearly 4,500,000 tons in 25½ months without a fatality. The secret, explains J. L. Hamilton, safety engineer, is "acceptance by management of the principle that safety starts at the top." Republic's program is covered in a two-part story which begins on page 195.

• Economic developments made history last month. The third attempt of the administration to regulate soft coal was signalized by enactment of the Guffey-Vinson bill. Appalachian operators agreed to the establishment of punitive compensation for overtime and increased basic rates. High spots in the coal act are given on page 225; salient features of the new wage contract on page 231.

Editorials .....	181
Notes From Across the Sea .....	216
On the Engineer's Bookshelf .....	217
Operating Ideas .....	219
Word From the Field .....	223
Letters to the Editor .....	234
New Equipment .....	235

COAL AGE is published monthly on the 1st. \$3 per year in the United States, Canada, Mexico, Central and South America; other countries, \$5, or 20 shillings. Single copies, 35 cents each. Entered as second-class matter Oct. 14, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U.S.A. Cable address: "McGrawhill, N. Y." Member A.B.P. Member A.B.C.

Contents Copyright 1937 by

McGraw-Hill Publishing Company, Inc.

Publication Office, 99-129 North Broadway, Albany, N. Y.

Editorial and Executive Offices, 330 West 42d St., New York, N. Y.

JAMES H. McGRAW, JR.  
Chairman

MALCOLM MUIR  
President

JAMES H. McGRAW  
Honorary Chairman

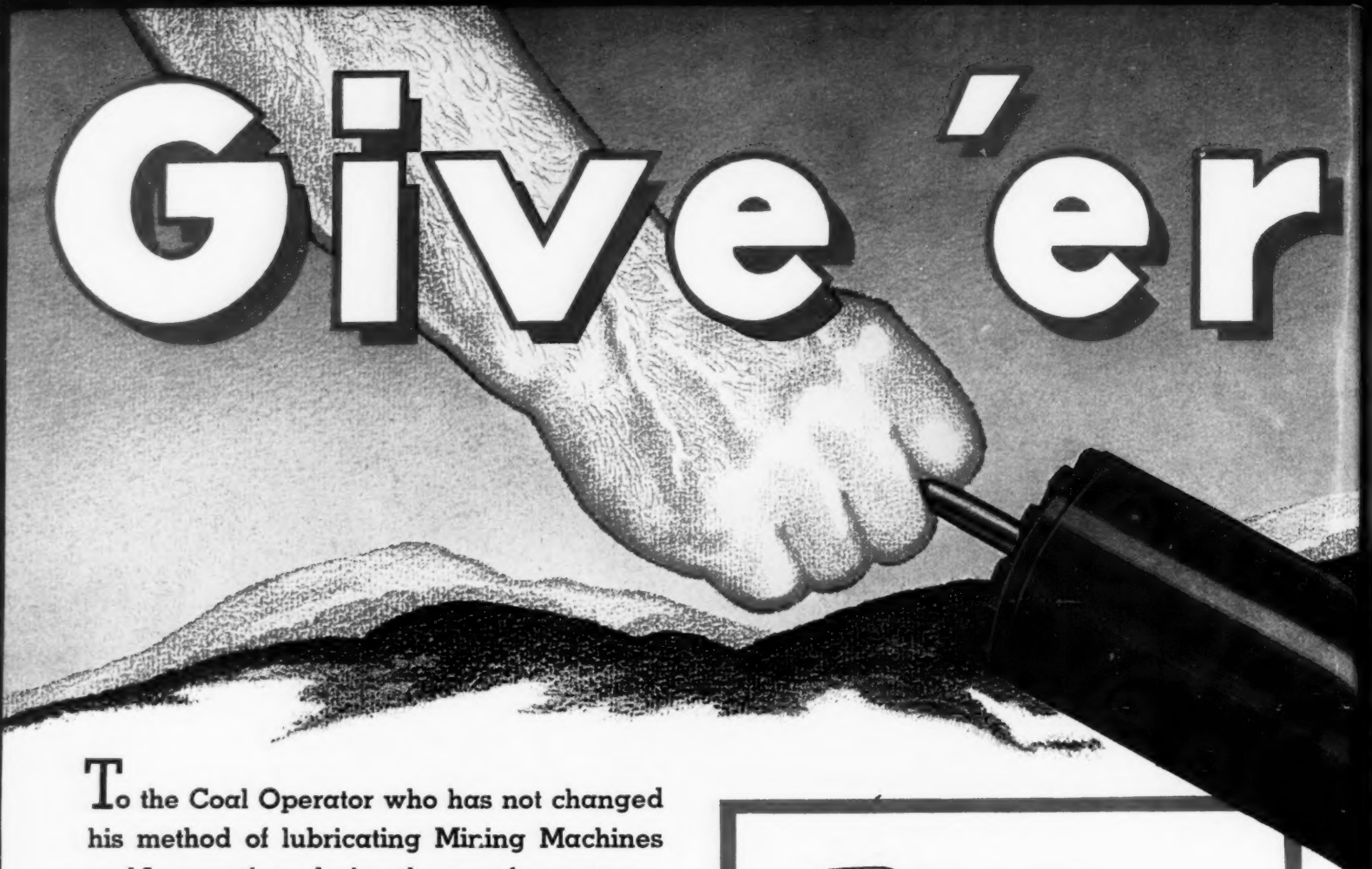
WILLARD CHEVALIER  
Vice-President

B. R. PUTNAM  
Treasurer

D. C. McGRAW  
Secretary

Branch Offices: 530 North Michigan Ave., Chicago; 383 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

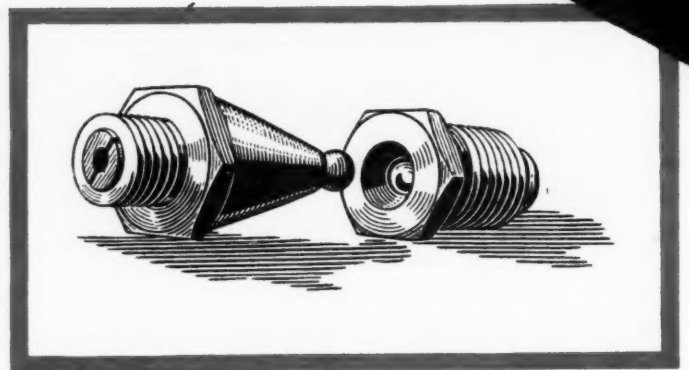
# Give 'er



To the Coal Operator who has not changed his method of lubricating Mining Machines and Locomotives during the past few years—"Give 'er the Gun"—probably suggests aeroplanes and speed. But to those who have changed over to the Hulburt System of Liquid Grease applied with the Hulburt Gun it means speed plus real economy. By this method all friction surfaces get positive, not haphazard lubrication.

Hulburt mining lubrication experts stand ready to prove to your own satisfaction that Hulburt Quality Grease with modern application will show decided savings to any operator. Write today for a demonstration on your equipment.

**HULBURT OIL & GREASE COMPANY**  
PHILADELPHIA, PA.  
SPECIALISTS IN COAL MINE LUBRICATION



These two fittings form the contact between gun and bearing. The ball-check at the right is opened by depressing it with the gun nozzle at left. The plunger then forces a stream of clean liquid grease to the bearing at high pressure. No chance for dirt to enter. . . . No wasteful slopping over of the lubricant. A clean job well done at savings no operator can afford to overlook . . . With the Hulburt System you think of grease in terms of pints—not gallons!

# HULBURT

# COAL AGE

Established 1911—McGraw-Hill Publishing Company, Inc.

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

SYDNEY A. HALE, *Editor*

May, 1937



## Why Cincinnati?

CINCINNATI again will be the host to mining men the week of May 17, when the American Mining Congress stages its 14th annual coal convention and exposition of equipment. Always a vital forum for the discussion of practical operating questions, this year's convention-exposition should have a still stronger appeal because of the competitive conditions facing the industry. Higher wages are now in effect in both anthracite and bituminous mining: it is dangerous to attempt to pass these on to the buyer. Higher costs can be absorbed only by increased efficiency; this means better management and better tools for production. How others are meeting the management test will be told in the technical sessions of the convention; better tools for reducing production costs will be on visual display in the exposition halls. Cincinnati calls.

## Rock Dust and Acid

MUCH of the earth's surface was once covered with Cretaceous measures, but such a mantle probably never was laid over any large area of Pennsylvania, West Virginia or Ohio. The West and South, as well as large areas in Europe, however, had such a mantle: in those regions mine waters are rarely acid—not perhaps because the acid is completely neutralized by the limestone but possibly because the sulphate of lime coats the pyrite with a relatively insoluble jacket which makes it less subject to oxidation and reaction with water.

Such an action occurs when a limestone dust coating is spread over coal, but there is the further advantage that the crevices in the coal are sealed and water and air penetration is pre-

vented. When coal is dry within and without, the rock-dusting of ribs of coal may be of little benefit, but in sumps where water rises and falls it would seem well to rock-dust with limestone or gypsum so as to seal the crevices against entrance of water. Whether the coating preferably should be of rock dust or of whitewash, mixed in hot water or cold, is a matter for test.

## Act Three

PASSAGE of the Guffey-Vinson bill last month opened the third act in the drama of coal-control legislation launched by the present federal administration with NRA in 1933. Although the new act differs in several important details from the 1935 Guffey-Snyder law, except for the amputation of the labor provisions which led to the invalidation of that earlier statute by the Supreme Court, the general design and purpose of the new legislation are unchanged. Ironically enough, the conference report on the 1937 bill was adopted by the House of Representatives the very day the court, in the Wagner Act cases, took a new view of labor and interstate commerce.

Such changes as have been made in redrafting, however, are all in the nature of improvements. These include the partition of the old Minimum Price Area No. 1, a lower tax rate for code members and a more equitable status for captive operations. But the fearsome arrangements for price determination and the futile coordination mandates remain. And the paradox of a statute which declares regulation "imperative for the protection of" interstate commerce in bituminous coal while specifically authorizing the avoidance of such control leaves Congress unmoved.

Under such circumstances, hope that the law will accomplish the laudable claims of its sponsors must rest not upon the statute itself but upon its administration by the agency it creates. Commissioners broad enough to realize the imperfections of the present law can do much to point the way to sane and necessary revisions. Whole-hearted cooperation between the industry and the commission can shape the law into an instrument for greater good—always assuming, of course, the statute can survive the shock of court attack.

## Dead Statistics

VITAL STATISTICS of industrial operations gain in value with promptness in collection, collation and publication. Released soon after the close of the particular period they cover, these data may serve as guides in plotting the progress of the immediate future; delayed too long, however, usefulness diminishes and the figures become simply records for the archives instead of tools for the working desk. Obviously, an over-all picture cannot be presented until all necessary individual figures have been assembled. Too frequently a collecting agency and clearing house, such as the United States Bureau of Mines, is criticized for delay in publication when the responsibility really lies at the door of the industry itself because of its failure to make with reasonable promptness the reports upon which final figures are based.

## Up to Management

NEGOTIATION of the new Appalachian wage contract with practically no interruption to production reflects high credit upon the conferees on both sides of the table. Stoppages of earlier years cost the industry so much in public esteem and in markets that the speedy conclusion of the 1937 negotiations must be set down as a distinct gain. So, too, is the fact that spokesmen for management and men achieved this happy result without the intervention of outside agencies.

Although some operators earnestly insisted that the industry was not in a position to increase basic wage rates, many others were reconciled to the inevitability of an advance before the negotiations started. Partial grant-

ing of the union demands for higher daily rates of pay, therefore, was no surprise. The unexpected was the successful fight of the union for time-and-one-half for overtime. Here precedents in many other industries hampered effective opposition.

That conditions peculiar to coal mining make it necessary for certain classes of employees to work longer than seven hours is conceded in the new agreement, but this recognition carries no exemption from the higher overtime rates. These rates, as well as the increases in base pay, are a direct challenge to management, first, to eliminate any and all unnecessary overtime where such may exist and, second, to improve efficiency of operations still further so that higher rates of pay may not unduly burden the industry in its efforts to hold present tonnage and to expand its markets. Unless this can be done, high daily rates may mean lower annual income to both capital and labor in coal mining.

## Anthracite's Finest

WITH an increased demand for all the finer sizes of anthracite, more activity should be in evidence in the saving and cleaning of the buckwheats smaller than birdseye or boiler coal for use in mine power plants and sale to the increasing number of utilities and industries that can burn these extremely fine sizes. Moreover, the use of fine coal in water filtration and sewage disposal is expanding; Oklahoma City, for example, has recently joined the group of municipal and private plants employing anthracite in water purification.

Anthracite producers also face the possibility that action will be taken to compel them to keep streams free of all coal fine enough to sink and form silt bars. It is rumored that anything larger than will pass 325-mesh may be regarded as too large for the Susquehanna River to transport to sea and hence as objectionable for disposal in that river. Discharged on dumps without large material to supply crevices in which it can snugly hide, fine coal on windy days gives rise to dust storms that make some anthracite communities uncleanly. Better and more profitable to sell this coal than to waste it.

# MECHANIZED MINING

## + With Cutting Machines and Conveyors

### In Heavily Pitching Seams

By THOMAS MURPHY

*Superintendent  
Northwestern Improvement Co.  
Roslyn, Wash.*

**T**HE Washington mines of the Northwestern Improvement Co. are near the head of the Yakima Valley in the eastern foothills of the Cascade Mountains in the Roslyn-Cle Elum field. This field, comprising about thirty square miles of coal land, is separated from the larger fields of the western part of the State by the main range of the Cascades and is the only coal of any consequence between these mountains and the east flank of the Rockies in Montana and Wyoming, a distance of almost 1,000 miles.

Mines were opened here in 1886, when the Northern Pacific Ry. was built through to the Pacific Coast. To date the Northwestern company has mined 40,500,000 tons, and the other mines in the field approximately 7,500,000 tons. While there are other minable seams in parts of the field, nearly all of this production has been from the Roslyn, or No. 5, seam, which has a fairly uniform thickness of 54 in.

#### Coal Pitches South

The coal outcrops on the northern edge of the field at an elevation of 3,750 ft. above sea level and pitches in a southerly direction on angles of from 10 to 56 deg. down into the first syncline. The bottom of No. 5 slope at the 13th level is now the lowest point in the mine workings, with an elevation of 500 ft. above sea level, so there is a difference of 3,250 ft. in a distance of about three miles. Roof conditions vary from a fairly firm sandy shale that can be held in the working places by posts on 4-ft. centers to a soft black shale that requires crossbars on very close centers.

Prior to 1927, all mining was done on the system commonly used in

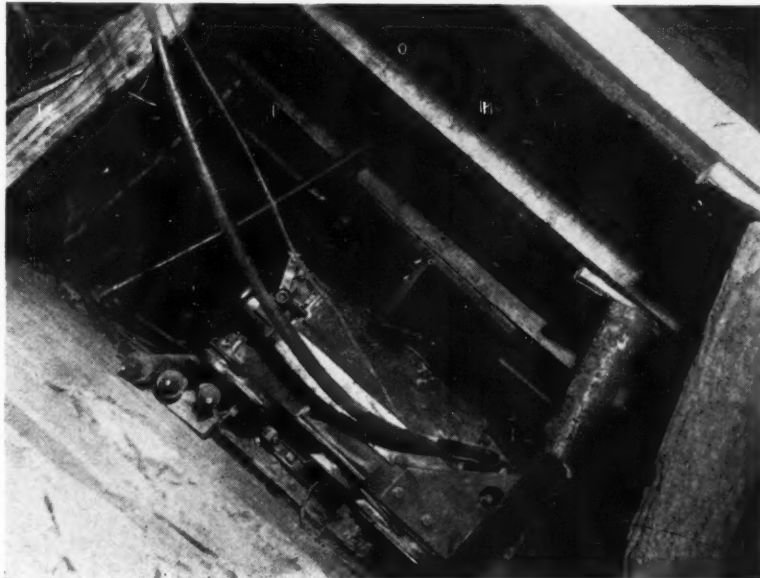
pitching seams in the West. Main haulage slopes were driven straight down the pitch; haulage entries were turned off each side of the slopes on about 300-ft. intervals, and the working rooms, usually 22 ft. wide, were driven straight up the pitch from the entries on 60-ft. centers. The rooms were double-tracked and had a rope sheave lashed to a post at the face. The loaded car going down on one track pulled the empty to the face on the other track. Rooms were driven continuously while the entry was advancing, and it was sometimes a matter of years before the pillars could be extracted.

With the mines advancing under

heavier cover to the dip, much trouble was experienced from squeezing, and it became very expensive to keep haulage entries and aircourses open. Much coal in the room pillars also was lost, as it was impracticable to clean up badly caved rooms to get tracks and mine cars up to the top of the pillars.

In 1927 it was decided to do some experimenting with shaking conveyors and shortwall machines in one of the lighter pitch sections of the mines. Two shortwall machines and two electrically driven shaking conveyors were bought and put in operation, the conveyors on old pillar work and the machines in reg-

Looking toward face of 12 East in No. 5 mine—45-deg. pitch. Note guard bolted to low side of machine to guide it away from rib and timbering.



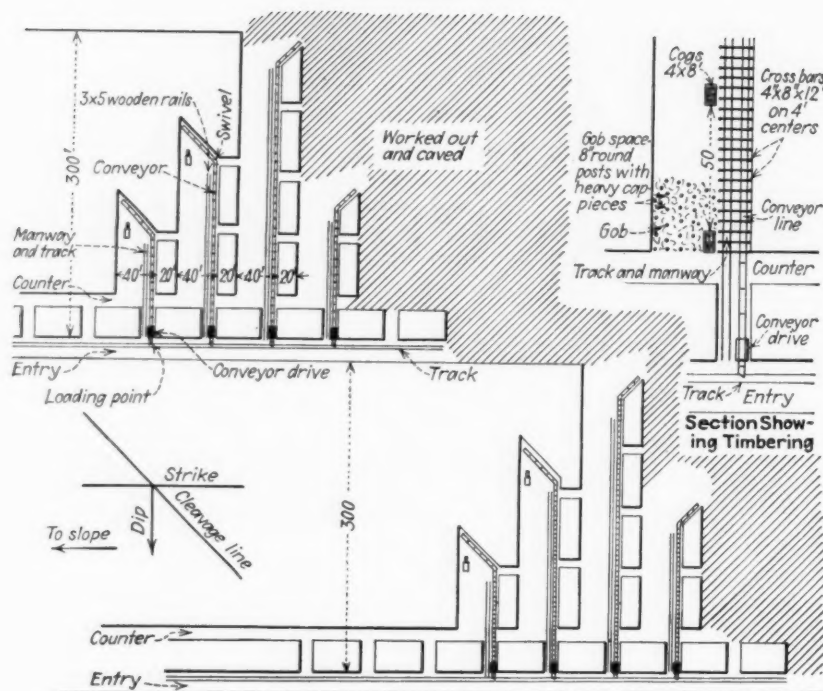


Fig. 1—Mining with shortwall cutters and jiggging conveyors in pitching seams

ular track rooms. The tracks in these rooms had 3x5-in. wooden rails, and the machines were equipped with wheels with a 4-in. tread. A line of sharpened studs was fitted into the wheel treads near the outer edge so that they would overhang the regular steel rail when traveling on the entry. These studs would dig into the wooden rails in the rooms and there was no particular difficulty in tramping the machines up pitches of 15 deg.

It soon became apparent that handling a single car at a time in the rooms was too slow, so more conveyors were built and installed in the rooms, loading the coal into cars on the entry. For a time a system in which one cutting machine and two conveyors were worked as a unit was followed. The machine was

trammed from one room to the other through a slant crosscut; while the loading crew of five men was cleaning the face of one room, the machine crew and a timberman would cut, drill, shoot and timber the other room. This plan was a considerable improvement, but, as much of the coal in the field lies on pitches considerably steeper than 15 deg., it was decided to devise a system whereby the cutting machine would stay in one place until it was finished and tramping would be wholly eliminated.

In the meantime, such economies had been effected by the use of machines and conveyors that a number of entries were driven in to the predetermined barrier line and it was possible to begin mining on a straight retreating system. In our

present system of mining only four places are worked at a time on any one entry; usually two rooms advancing and two pillars retreating.

Where the roof is at all good the rooms are driven about 40 ft. wide on 60-ft. centers. The conveyor trough line is installed close to the inside rib, and a light wooden track is laid adjacent to it. This track is for taking timber and other supplies to the face, a 12-in. wheel being kept lashed to a post near the face and a small truck pulled by a hoist on the entry with the rope around the wheel being used to operate it. The track also serves as the room manway (see Fig. 1).

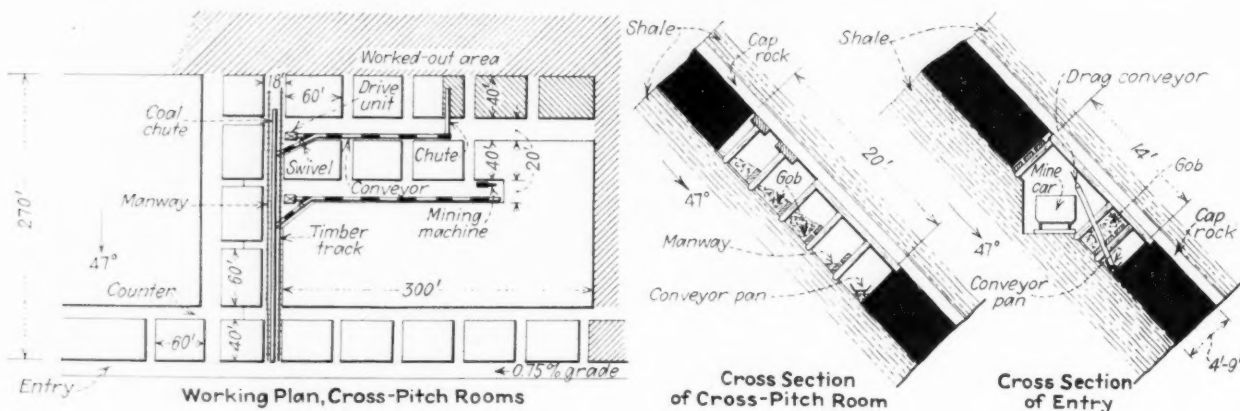
About 10 ft. of the side of the room containing the conveyor line and manway is timbered securely, usually with crossbars, but not much effort is made to hold the roof in the rest of the place and the cap rock usually caves before the place is finished. However, 4x8-ft. rock-filled cribs are built on about 50-ft. centers alongside of the manway as the room is advancing, in order to protect the men from a sudden cave of the main roof as the pillar is being pulled down.

#### Need Cut Only 10 Ft.

There is only one bedding plane in the Roslyn seam—a band of shale, bone and clay about 18 in. from the bottom. There are vertical cleats or cleavage planes, however, every few inches in the coal. These cleavage planes are on about a 45-deg. angle to the line of the room, and it has been found that if one side of the room is advanced so that the face is on the line of the cleavage planes it is necessary to cut only about 10 ft. of the tight side of the room and the rest of the face will slough or work itself.

As the room face is, therefore, on about a 45-deg. angle to the line of conveyor troughs, a swivel is used

Fig. 2—Method of working entries and cross-pitch rooms with shortwall machines and shaking conveyors



on the end of the main conveyor line, and a line of troughs with the sides next the face flattened down is extended clear across the face from the swivel. The main conveyor is extended as needed and the face troughs are moved up close, so that much of the coal falls from the face directly into the troughs without shoveling, and the rest can be raked in without much effort. Loading is practically continuous, as coal can be loaded from one side of a room while a machine is cutting the other side.

When a room is driven through to the caved ground above the top of the pillars, it is sliced off on about a 60-deg. angle. Four or five troughs are swung over on this angle from the swivel and the work of extracting the pillar is begun. As the pillar is only 20 ft. thick, it is all taken out within a few days. With this system of mining all of the coal is recovered, and, by keeping about a 45-deg. breaking line and placing the timber cribs systematically, very little trouble is experienced in controlling caving.

### 23 Men in Entry

Cutting machines are not used in the pillars, so two machines and four conveyors constitute the equipment for one entry, and the output usually is about 300 tons per seven-hour shift. One unit foreman and 22 men comprise the crew for working an entry.

Within the last few months a system of working machines and conveyors in areas where the coal pitches over 45 deg. has been devised which promises to solve what has been the most difficult problem in the field. In this system, planes are driven at 300-ft. intervals straight up the pitch from the haulage entry to the caved ground of the entry above. A material track is laid next to the inside rib of the plane. A sheet-steel-lined chute about 4 ft. wide and built up to the roof is installed adjacent to the material track, and a traveling way for the

men is provided along the outside of the chute.

Rooms, 20 ft. wide on 60-ft. centers, are driven across the pitch in by of the planes. Conveyor drives are set up just off the planes in the room necks and the trough lines are run along the low side rib of the rooms. The conveyor trough lines are carried over the driving engines and a curved extension trough carries the coal around over the material track and dumps it into the master chute, from which it is loaded into the mine cars on the entry (see Fig. 2).

In driving the rooms, a line of heavy posts is set about 2 ft. above the conveyor line. One-inch boards are nailed to the high side of this line of posts, forming a bulkhead to hold the gob. A line of smaller posts is set close to the high side rib and lagging is used to keep that rib from sloughing while the room is being driven in. In the battery of rooms that has been worked on this system no cutting machines were available, so the rooms were driven by hand, but, by keeping the faces on the line of the vertical cleats, very good progress was made, as on this pitch the coal slides down into the conveyor and requires no shoveling at all.

After the rooms are driven in to the line, the end of the 40-ft. pillar above is shot off and the work of extracting it is begun. Stationary sheet-iron chutes are laid from the low side of the pillar down through the gob to the conveyor line to carry the coal. The pillar is worked loose-ended. Little or no shooting is required and it has been found that pneumatic picks are great labor savers in this work.

Production per man on this work has not been as high as on the regular machine and conveyor work on the lighter pitches, but there is no doubt that this is due to the lack of cutting machines, so provisions are being made now for some of the new light-type machines, as it is believed that they will be more suitable for this work than the heavy standard shortwalls.

About a mile of main entry and airway has been driven across this 45-deg. pitch with machines and conveyors and it has been found thoroughly practical to use machines under these conditions. In this entry work the conveyors are used much as described above, but it has been found necessary to use an elevating conveyor to raise the coal from the level of the shaking conveyor on the

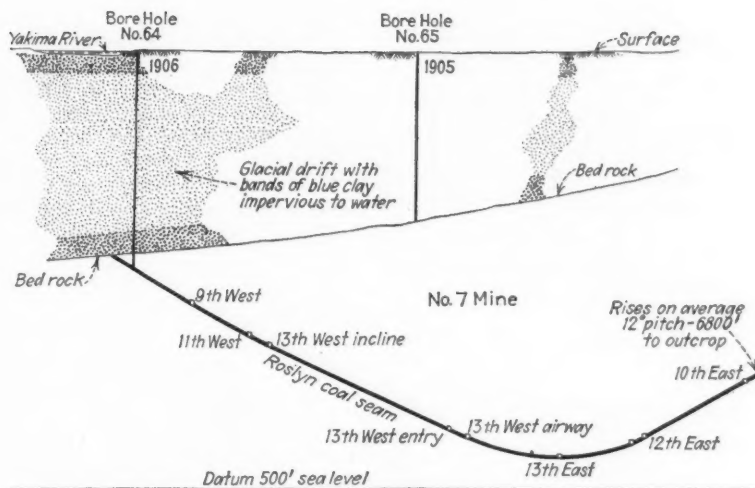


Fig. 3—Profile through east section of Roslyn field looking west

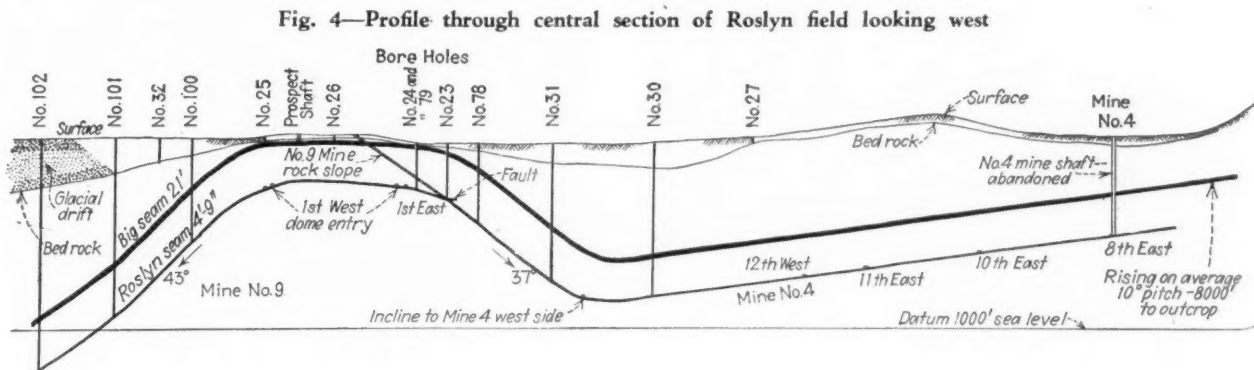


Fig. 4—Profile through central section of Roslyn field looking west

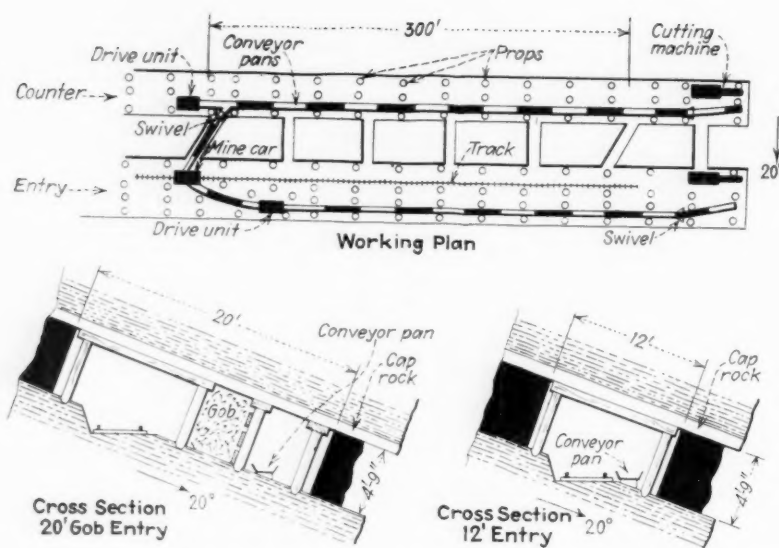


Fig. 5—Method of driving entries and rooms with shortwall cutters and loading with shaking conveyors

low side rib to the height of the mine car on the track, which is about in the center of the entry.

To use a cutting machine on this work a heavy steel guard is bolted to the low side of the machine to protect the feed drum and other projecting parts from catching on the low side rib or timber. A line of heavy posts is set just above the conveyor line and 2x12-in. planks are spiked to the high sides of the last three posts toward the face. When not in use, the machine rests against this planking.

When the place is to be cut, a jack pipe is set straight ahead of the machine against the face. The machine is pulled forward until it balances around the end of the plank at the last post and the end of the cutter bar slides down into the low corner of the place. A jack pipe is then set down through the slot in the cutter bar to prevent the ma-

chine cutting too far down the pitch. The machine then starts to sump in. When it cuts ahead a few feet, the rear end of the machine is pulled free of the end of the planks and settles down against the low rib, and the sumping cut is then completed.

A jack pipe is then set against the high side rib and the cut across the face is made in the ordinary way. When the cut is finished, another jack pipe is set close to the high side rib some distance back of the machine. The feed rope from the low side drum is attached to it and the machine is pulled back from the face. It can either be left suspended on its ropes or lowered against the planking until needed again. The face is then drilled and shot and, as stated above, the coal slides down into the conveyor trough without having to be shoveled.

The entry aircourse, or counter, is handled much the same way as

the main entry. The aircourse being above the entry, the conveyor drive is set at the top of a crosscut and the coal is fed from the conveyor into a chute leading down through the crosscut and loaded into cars at the same point as that from the main entry (see Fig. 5).

Self-loading duckbills have not been used to any extent in this field for the reason that the character of the roof makes it necessary to keep the timbering right up to the face, and, as the seam is only 54 in. thick, is set at the top of a crosscut and forepoling is difficult. By keeping the room faces diagonal to the line of the room and using swivels and flat-sided loading pans close to the face, it is felt that there is not so much to be gained by trying to use duckbills in the rooms. However, there is a need for them in entry driving, merely to advance the loading pan to the face along the low side rib, and some of them are being installed at the present time.

All conveyor drives and troughing are built in the mine shops. Sixteen-pound track rails are arc-welded to the bottom of the troughs as stiffeners, and a simple link and wedge fastener is used for coupling the troughs instead of the usual bolt fasteners.

Much experimenting has been and is still being done to adapt mechanical equipment to the widely varying conditions in the Roslyn field, and in carrying along this work a few things have become fairly obvious. One is that cutting machines can be used under practically any conditions found in a coal mine, but that in work on heavy pitches it is not practicable to tram them from place to place, and that there is a real need for a much lighter machine than has been available, at least until just recently. Another is that shaking

Left, room conveyor loading into mine car on entry; note jack pipes used to hold conveyor drive in place. Right, completed section of main-haulage entry



conveyors, because of the ease of extending or retracting the lines, probably are the most practicable means of handling coal from the face to the mine car where it is possible to work them on the level or downhill. They will carry coal up as much as 7-per-cent grade, but the capacity is cut down on uphill

work, and some other type of conveyor would be preferable.

It is the general belief here, however, that any type of conveyor is preferable to tramping one mine car at a time into the working faces. Also, that by loading full trips of mine cars on the entries with conveyors the size of the car does not

make so much difference. The cars here hold about 2,500 lb., and to use larger cars would mean much more rock brushing in the entries.

All machines, conveyors, and any other electrical equipment used by the Northwestern Improvement Co. in the Roslyn field are government-approved types.

## MOBILE LOADERS

### + And Conveyors at Ohio Truck Mine

### Yield 9.7 Tons per Man-Shift

By J. H. EDWARDS  
*Associate Editor, Coal Age*

FROM a new mine in 42-in. coal, Earl J. Jones, of Zanesville, Ohio, produces 1,400 tons per day — all loaded by mobile units and transported by conveyors exclusively from loaders to tipple. The average efficiency is 9.7 tons per shift per man employed underground. Prompt purchase of new equipment when production or efficiency considerations indicate the need and an attempt to secure the best in quality and performance even if the first cost is higher are principles of the Jones management. During 1936, Mr. Jones invested over \$200,000 in underground mechanical equipment, and the additional investment in 1937 probably will exceed \$60,000.

A mine-run contract for the Philo generating plant of the Ohio Power Co. affords a steady outlet for a substantial percentage of the Jones output during all months. Throughout the domestic heating season, 50 to 100 tons per day of bar-screened 4-in. lump and 2x4-in. egg are sold at the mine tipple to the local trucking trade. The Philo contract includes delivery in barges at the power plant unloading terminal on the Muskingum River. This involves trucking somewhat over 5 miles over poorly maintained roads and shipping five miles down the river. In case river traffic is blocked by ice (usually the river remains open practically all winter) the coal can be trucked di-

rectly to the power plant. The additional haul of five miles is over two free bridges and a State road with a new concrete surface.

Jones mine is in the Cooksville district in Muskingum County 5 miles due south of Zanesville and out in the country 4 miles southwest of a bend in the Muskingum River. It is in a hilly section without direct access to Zanesville and the preferred road from the mine to Zanesville is 5 miles via the trucking route to the Muskingum River, thence 6½ miles northwest on State Highway No. 77.

The mine is in the No. 6 (Middle Kittanning) seam, which there averages 46 in. in thickness (parting and bone coal included) and has a uniform rise to the northwest of 17 ft. to the mile without severe local dips. Except for a 1½-in. to 2-in. parting of hard slate 20 in. above the bottom and occasional lenses of pyrites, the coal stratum itself is free of segregated impurities. At the top occurs a 4-in. stratum of bone coal which, in common with the parting, is mined and loaded but is later cast aside by pickers. The roof is an exceptionally strong slate which stands unsupported in rooms 40x300 ft. Although the seam outcrops along the main valley, the cover ranges up to 175 ft. and averages approximately 100 ft.

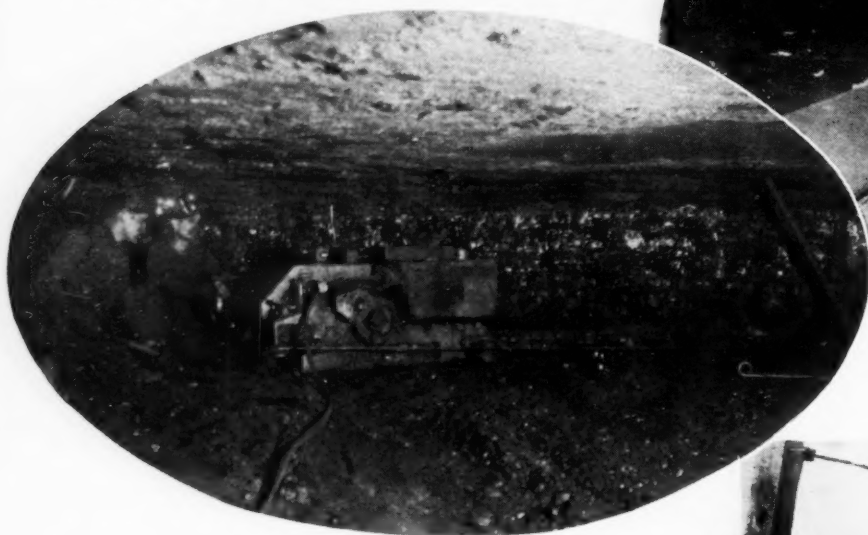
Mr. Jones has fee tracts aggregating 1,500 acres. The plan is to mine 350 acres with the present set-up of tipple and of main belt on the drift heading. At least three other similar set-ups — in effect, three more mines — will be required to recover the present holding of fee acreage. Because a set-up will be used only three to seven years, the investment in tipple structure is held to the bare minimum consistent with reliable operation. Thus the unpretentious wooden tipple of the Jones mine stands in marked contrast to the elaborate underground equipment. Maximum haul by main belt will be 4,300 ft. in the present workings, will not exceed 1½ miles in any set-up and the average of the maximums at the several operations will be one mile.

Installation of conveyors was begun in March, 1936, only a few months after the mine was opened by the hand-and-car working; by August, 1936, the operation was completely mechanized with a belt conveyor on the Main West (a new heading to daylight), chain-flight conveyors in the room entries and in rooms, and Joy 8BU loading machines. Equipment now in use includes: one Joy 30-hp. 36-in. x 125-ft. belt conveyor extending from the mine portal to the top of the

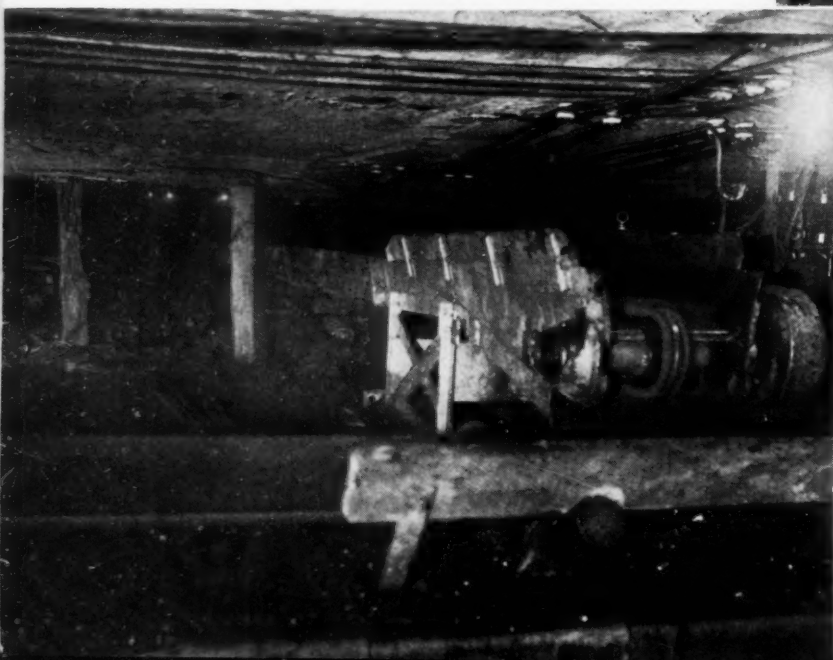


Here the loading machine is cleaning up a breakthrough cut in the left-hand rib close to the face of the room.

Sumping the cutter in at the right-hand corner of the room as soon as the loading machine has cleaned up that half and has moved to the other side of the room conveyor in the center.



Looking back into 3 North from the belt-conveyor heading. Three chain-flight conveyors in series carry the coal 880 ft. from room units to the belt.



View of the outside plant from above the drift portal. The shop and supply house appear at the right.



Looking from the face of a room toward the neck, where, close to the chain-flight conveyor, may be seen the blower which is driving air through the tubing at the left.



Coal discharging to the sloping bar screens above the tippie bins. This elevating conveyor, extending from the mine portal to the top of the tippie, is a standard underground type. Its totally inclosed 220-volt a.c. motor appears at the right.

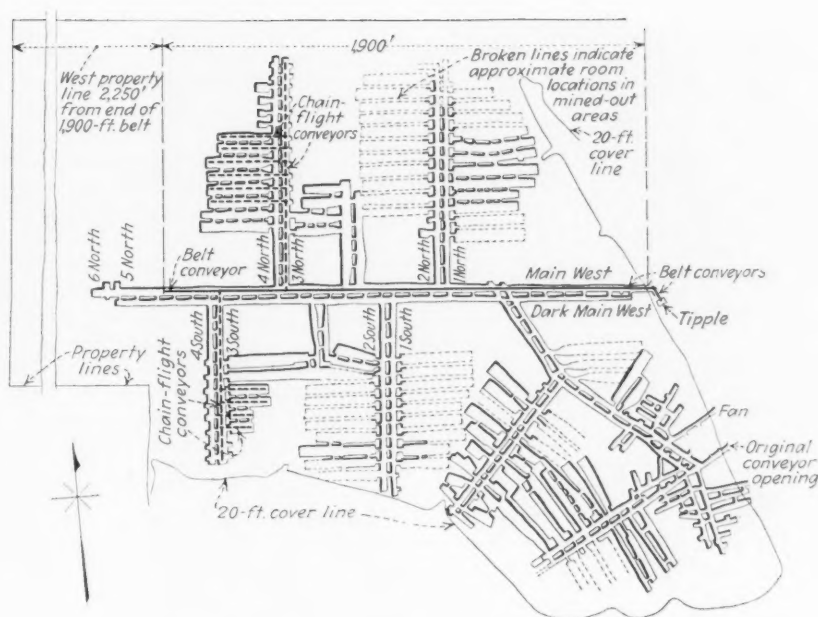
tipple; one Joy 30-hp. 26-in. x 1,900-ft. belt conveyor operating at 250 f.p.m. on the main heading; two Joy 300-ft. chain-flight entry conveyors working in room or butt entries; five Jeffrey 61W 300-ft. chain-flight conveyors in room or butt entries; ten Jeffrey 61AM 300-ft. chain-flight conveyors in rooms; five Joy 8BU loaders; eight Jeffrey 35B standard cutting machines with 7½-ft. cutter bars; one Morgan-Gardner with 7-ft. cutter bar; one Morgan-Gardner machine with 5½-ft. cutter bar; five Jeffrey A-7 electric drills; and five Jeffrey blowers with flexible tubing. Seven of the Jeffrey 35B machines, which are new ones installed last month, displaced an equal number of Morgan-Gardner 5½-ft. cutter-bar machines.

Rooms 32 ft. wide on 47-ft. centers are driven 300 ft. deep and one slabbing cut is mined from the pillar as the equipment is taken from the room. Each loader works in two adjacent rooms in each of which is installed a separate conveyor. Cross-cuts are driven every 45 ft. to reduce the distance of loader travel between rooms. Throughout each shift, cutting, drilling, shooting and loading is carried on as a continuous operation in the two rooms by the crew unit and the work is triple-shifted. Seven men and a boss make up each Joy crew. The seven consist of the Joy operator and his helper, two machine men (both capable of operating the machine instead of one operator and a helper), two men who drill and shoot and one slate picker. In five days of three-shift work the mining of a 300-ft. room is completed.

#### Entire Seam is Loaded

The entire seam, including parting and top coal, is loaded into the conveyor. The crew slate picker picks as much of the waste material as possible from the room conveyor and piles or stacks this waste along one side of the room. The conveyor is positioned in the center of the room and the side from which the slab is to be mined is kept free of all waste. Second and final picking is done by three men stationed on the outside along the inclined belt which elevates to the tipple and protected by a pick-house which is directly above a bin from which the refuse is drawn into trucks for disposal.

With but one mining machine equipped with 7½-ft. cutter bar the two machine men could come very close to keeping the loader in coal. But it was recognized that the basis of efficiency is to keep the loader engaged to the best advantage every moment, hence the regular requirement is a mining machine for each



Mine workings and conveyor locations as of March 1. Although worked in pairs, each room has its own conveyor extending out into the heading

room; i.e., two per unit. When the cutting of one room is practically finished and the helper is no longer needed, he can go to the other room and move the other machine to cutting position. Using two machines also minimizes interference with production in case one breaks down.

Very often the cutting in a room is begun as soon as the loading machine has cleaned up the right-hand half. The drilling follows closely after cutting and usually some of it is done during times when the cutting machine is stopped temporarily awaiting further progress of the loader across the face.

To increase loading speed and reduce strain and wear on the equipment, a "center shot" is loaded out to the back of the cut before the rest of the coal is shot down. After working its way through the center shot, which takes about three minutes, the loader is backed away into the clear while the rib shots, which thus have been provided with open ends, are fired. The coal of the "center shot" is brought down by two shots, the first placed in a 7-ft. hole drilled parallel to and directly over the hard slate parting and the second above the first in a 5-ft. hole with the explosive placed in the top coal and against the slate above. Since tamping the rib shots is completed before the loader backs away from the center, there is no delay in their firing. Austin No. 4X 1½-in. 5-pellet-stick powder is used; the charges are one stick and three pellets in the breaker holes and one stick and one pellet in the rib holes.

Entry headings are driven 20 ft. wide and the method is practically the same as in rooms—that is, the two room conveyors and all other items of a room-pair unit are moved from room service and put to entry driving. From the standpoints of labor required and avoidance of delays, extending of conveyors in each heading is considered preferable to using one main conveyor in combination with a breakthrough conveyor and a short conveyor therefrom to the face of the second heading. When a room heading is being driven, rooms are necked 20 ft. wide, two cuts loaded from each and a third cut is left shot down.

#### Travelways Are Provided

Meticulous care is exercised to provide and maintain travelways 8 ft. wide alongside entry conveyors to facilitate moving equipment when a pair of rooms is completed or an entry driven to bounds or temporarily halted, and to provide maximum convenience in delivering supplies. The better walkways for men are a further advantage, especially because of the low roof and the fact that no top rock is taken; not even at the conveyor junction points.

Along the conveyor headings the parting and bone-coal material picked from the conveyors is piled to one side and fenced by a pack-wall stacked to the roof. Waste material in the aircourses also is kept to one side, thus providing a clean travelway for a pony and sled, which is the principal means of delivering supplies to and from sections and to and

from the outside. There are no car tracks in the mine. Normal supplies of drills, bits, oil and powder are hauled by the pony and sled; the heaviest items, such as large conveyor drives, are carried on the cutter bar of a mining machine which is dragged along the bottom by its own power, or in some cases are dragged back of a Joy loader which has been trammed to the outside for that purpose.

Generally speaking, the bottom in the mine is dry and hard. Practically no water is encountered and sufficient pillar coal is left in place to forestall surface breaks until the mine is finished. Only recently was one small pump installed in the mine, this to clear up a small mud hole which was developing on the main entry in the mine workings.

### Conveyors are Reversible

To accommodate material delivery and transfer, all conveyors are reversible, but, since practically no mine props are used and there is but one hour in 24 that the conveyors are not carrying coal, little material actually is carried on the conveyors. Only the main belt is thus utilized to any extent and the material to be thus conveyed is put into boxes, which, with their loads, do not weigh more than a maximum of 100 to 150 lb. each.

All conveyors are powered by 220-volt a.c. motors and the mining machines, drills, blowers and loading machines by 250-volt d.c. motors. Electric service is purchased from the Ohio Power Co. and the conversion is handled by two 150-kw. m.-g. sets situated at the mine portal. Near by are three 37½-kva. 4,000/220-volt transformers which supply the fan, main conveyor, tippie elevating conveyor and shop motors. Situated at the top of an 85-ft. borehole on the main heading at 6 North are three 50-kva. 4,000/220-volt transformers which supply the chain-flight conveyors. Any outage or voltage fluctuation caused by difficulties or overloads on the d.c. machinery has no effect on the conveyors; thus the main arteries of the mine function with certainty and at a uniform speed.

Total mine power has averaged 3.2 kw.-hr. per ton and the power cost runs close to 5c. per ton. The use of conveyors, mining machines and loaders to transport new equipment into the mine is charged with having been responsible for a significant amount of the power consumption.

Besides the eight men of each loader crew, those working underground per shift include one wireman, one

bratticeman, one pony driver, one greaser, two clean-up men and one electrician. On the third shift, however, no pony driver is employed because all supplies necessary for the three shifts are delivered during two shifts. Production per shift per man employed underground is 9.7 tons. The production per loading machine, narrow work included, has averaged 100 tons. All five loaders are not always operated every shift; at times only three or four, as suits the production required.

To extend the 26-in. main entry belt 624 ft. to bring its total length to 1,900 ft., which was done in February, 144 man-hours of labor was required. The job was accomplished in one day by seventeen men. The belt pans, which are 12 ft. long, each carry two troughing idlers with sealed ball bearings. A flat return idler, also fitted with sealed ball bearings, is mounted at each connection between pan ends.

Use of sealed bearings practically eliminates lubrication cost. To date only a few of the bearings have failed and it is surmised by the mine officials that these failures were caused by a progressive corrosion beginning on the exposed surface of the race. These outer surfaces now are being oiled occasionally to prevent corrosion.

### Special Drum on Cutters

Previous experience in the mine had indicated that in the moving of cutting machines lay an opportunity for improvement. Dragging them along the bottom at the normal rope speed of 17 f.p.m. consumed an undue amount of time, especially on the long moves into new rooms or new sections. Consequently each of the seven new Jeffrey 35B machines was ordered with a special auxiliary drum geared for a moving speed of 150 to 165 ft. per minute. This drum is mounted at the left-hand rear corner and did not displace the regular drum. Jeffrey Star bits had been used with excellent success on the one original Jeffrey machine, so were specified for the seven new machines.

To replace a disk fan with which the mine was first equipped a new Jeffrey Aerodyne fan was installed March 15—the first of its type in the State. This fan, driven by a 15-hp. motor loaded to 13.5 hp., is now operating at 685 r.p.m. and is delivering 92,000 c.f.m. at 1.65 in. water gage. As mining progresses the speed will be increased to 1,200 r.p.m., at which the guaranteed delivery is 92,000 c.f.m. at 5½ in. water gage. High velocity is necessary to clear away the smoke rapidly from

the frequent shooting during the day.

Trucking from mine to wharf over the semi-hard-surfaced country roads costs as an average 25c. per ton, but goes up to 40c. per ton during seasons when the roads get into bad condition. The route includes several short hills with severe grades. When the roads are in favorable condition, Mr. Jones is able to haul his entire output with his own fleet of fifteen self-dumping trucks rated at 1½ and 2 tons capacity. At other times he must hire five to ten extra trucks. The round trip of practically 11 miles is made in 55 minutes when roads are good, but requires 1½ hours or more when they get into bad condition. The Jones fleet contributes approximately \$750 per month to the State in gasoline taxes and license fees.

### 1½-Ton Trucks Favored

The trucks are equipped with overload or helper springs and the loading averages 5½ tons. After experience with several types of trucks, including the Ford, Mr. Jones favors the 1½-ton Ford with dump chassis for his transportation conditions. These new trucks he has equipped with special bodies made long and wide to hold the load lower than in the regular body equipped with sideboards. Firestone tires are now used exclusively. Pressures of 95 to 100 lb. are carried in the 32x6-in. size and 100 to 110 in the 34x7.

Carrying the coal five miles by barge from river terminal to the Philo power plant is contracted to a river transportation company. By the terms of this contract six 300-ton steel barges are leased to Mr. Jones and their movements are subject to his orders exclusively. Usual fluctuations in water level are so slight that the barge-loading terminal consists merely of a road-level platform terminating in an apron chute onto which the trucks dump. The flood of last January rose to more than 6 ft. above the roadway level and caused the mine to be shut down for three weeks.

The coal is sold to the power company on the basis of 12,000 B.t.u. per ton and at that heating value the ash content is between 9 and 10 per cent. Samples for analysis are taken about every third truckload.

Mr. Jones acts as general superintendent of the mine and in so doing gives personal attention to all phases of management and operation including close supervision of trucks and truck drivers. Roy Lucas, mine superintendent, has the responsibility of maintaining the required production.

# An Invitation

TO THE CINCINNATI CONVENTION

From the  
National Chairman

▼

**C**OAL MINING men have in recent years come to regard the American Mining Congress May meeting in Cincinnati as an open forum for the exchange of ideas on every phase of their business. This exchange takes place in the public presentation and discussion of papers, the visual impressions of the exhibits and in countless informal conversations between members of the industry.

We believe that this coming convention will equal or exceed the high standard of its predecessors. A carefully chosen list of subjects will be covered by papers and prepared discussions by those most conversant with their topics in the judgment of the program committee and its advisers. These papers will be diversified and will be concise, and in the main will deal with actual accomplishments in modern coal mining. Where they are speculative, the speculations are those of men whose experience and experiments give them value.

Exhibits will be even larger and more varied than in previous years and will cover substantially all types of equipment involved in the moving of coal from seam, through intermediate processes, to customer, and will show adaptations to many special cases, as well as standard forms. Manufacturers are sparing no expense in their development programs or in presenting the results thereof to operators.

May, 1937 — COAL AGE



A most capable committee is providing entertainment for each evening, along the general lines of last year, which will be so favorably remembered.

Early reservations in Cincinnati hotels for convention week, which may be regarded as an index of interest, are much more numerous than hitherto, which clearly indicates an enlarged attendance.

This growth year by year can only come from the general recognition that here is something of real value, something which contributes to the solution of our operating problems. The committee feels that it can safely assure the industry that the values which it has found in this convention and which have won its increasing support, will be continued in full measure this year.

A handwritten signature in cursive script, reading "C E Bowman".

National Chairman, Program  
Committee, American Mining Congress



The Little John stripping unit making first box cut in December, 1936.



Switch houses at the end of pole-line laterals permit attachment of the shovel cables. The second set of conductors shown serves the pump line.



Loading coal at Little John.

Small portable pumps dewater the pit. A 5-in. unit with spiral-riveted discharge line is shown here.



# LITTLE JOHN STRIPPING

## + Made Possible by Improvements In Equipment Design

By IVAN A. GIVEN

*Associate Editor, Coal Age*

**M**ADE POSSIBLE through the development of improved stripping and preparation equipment, the new Little John mine of the Little John Coal Co., Victoria, Ill., taps a virgin field of Illinois No. 6 coal in Knox County aggregating approximately 20,000,000 tons. Coal is stripped by an electric shovel with a 32-cu.yd. dipper, loaded by an electric shovel with a 5-cu.yd. dipper, hauled by trucks and trailers, and prepared in a washing, screening and drying plant built around crushing the entire pit output to 6 in. or less.

### Operation Long Planned

In its finished form the Little John operation represents the realization of long-time plans by R. H. Sherwood, Indianapolis, Ind., president of the Little John company, who first became interested in the possibilities of the field now being worked while still associated with W. G. Hartshorn in the Danville field of Illinois about twenty years ago. It was not until recently, however, that he considered that progress in the development of equipment, particularly for mechanical cleaning, had reached the stage where the natural handicaps in the new field could be overcome economically.

The major problem to be solved was the handling of intrusions of soft shale (known locally as "white top") in the vein. These intrusions, many in number, often represent a considerable volume of material and have been the major stumbling block encountered in proposals to operate the seam in the past. Because of the nature and volume of the white top, its removal either in the pit or in the conventional screening and

hand-picking plant to the point where a commercially salable coal could be shipped was impracticable. Consequently, a mechanical cleaning plant able not only to eliminate impurities efficiently but also in quantities was indicated and incorporated in the development set-up. This plant is described in detail in the article beginning on p. 199 of this issue.

The Little John field is roughly rectangular in shape and measures about eight miles east and west and three miles north and south. There are several gullies and ravines through the property and in some instances streams have cut down through the coal bed. Average thickness of the seam is 4 ft. The overburden decreases to 16 to 20 ft. at the outcrop and in a few spots thickens to more than the practicable stripping depth of 60 ft. Average overburden thickness is 36½ ft.

### Coal Overlaid by Slate

Directly over the seam, as a general rule, is 5 to 6 in. of black slate, although it is absent in some places. The next member is a limestone which, when present, varies from 6 in. to 2 ft., averaging 12 to 15 in. Next is a shale with a maximum thickness of 12 ft., which is overlaid with clay and surface soil. Both the overburden and the coal are dug without shooting.

Stripping is done by a Bucyrus-Erie 950B electric shovel with 32-cu.yd. dipper, 105-ft. long bridge-like boom structure (adjustable to 102 or 108 ft.), 72-ft. cylindrical dipper stick with rope crowd, indi-

vidually driven caterpillars, automatic leveling and counterbalanced hoist. Working three shifts a day, this unit has moved 574,380 cu.yd. of overburden in one month, 37,590 cu.yd. in one 24-hour period (three consecutive shifts, with an average of 28.3 cu.yd. per swing), and 13,660 cu.yd. in one 8-hour shift. An even better performance is expected by the company when the crews have had more experience with this new shovel. In common with the practice at the pits of the other Sherwood companies, in Indiana, cuts are staked off in advance. With the overburden thickness prevailing at the time this article was prepared, the width of the pit, measured on the coal, was about 90 ft., of which 50 to 55 ft. is loaded by an 85B electric shovel with 5-cu.yd. dipper, leaving the rest of the coal as a berm on which the haulage units operate. Welded high-tensile-steel dippers are installed on both the stripping and loading shovels.

### Bulldozer Removes Refuse

Loose refuse left on the coal by the stripping shovel is pushed to the spoil bank by a Caterpillar RD-7 diesel tractor equipped with a Laplant-Choate bulldozer with 8-ft. blade. This unit also is employed in rooting out and disposing of the larger intrusions of white top. Occasionally, when conditions make it possible, the loading shovel may be moved ahead near the end of its single operating shift and used to dig out the white top, disposing of it by casting. No cleaning other than the above is done in the pit, the loading

shovel taking with the coal any casual refuse, small white-top intrusions, and the remains of the larger intrusions after the bulldozer has done its part.

Coal is hauled from the pit to the dump hopper at the preparation plant by five tractor-trailer units. Three of these consist of White tractors pulling 20-ton air-operated Austin-Western trail cars, while the other two are Euclid "Trac-Trucks" built up from 7 to 15 tons. A third Euclid unit with a capacity of 20 tons is now on order, but at the time this article was prepared the five units in service had handled as high as 4,000 tons of material in seven hours over an average round-trip haul of 1½ miles.

One runway only was in service at that time, but additional such openings through the spoil bank will be made in the future. The original runway enters the pit at approximately the center and the haulage units go either to the right or left on the coal berm and turn in front of the loading shovel. The main road to the dump is mainly constructed with a "red dog," or burnt-shale, base about 12 in. thick with

a topping of approximately 6 in. of mixed cinders and gravel. On one stretch a brickbat base was installed. The road is maintained with an Adams grader and the bulldozer regularly employed in spreading refuse.

Both the stripping and loading shovels operate on 4,000-volt current obtained from the 33,000/4,000-volt substation of the Illinois Power & Light Co. The pole-line system of power distribution is employed, with laterals from the main line on the bank ahead of the pit at 750-ft. intervals. Shovels are equipped with 1,000-ft. trailing cables, which connect into oil switches in skid-mounted wooden switch houses set on the ground at the pit end of the laterals. Each switch house contains two oil switches and the necessary facilities for making connections.

Pumps are the only other electrically operated equipment in the pit. These operate off a separate 440-volt pole line, which in turn receives power from the main 4,000-volt pole-line circuit through 4,000/440-volt transformer banks. The pump pole line parallels the pit and is built with light one-man poles.

The separate line, it is felt, is more practicable than transporting transformer units from place to place with each move of a pump—a relatively frequent occurrence at Little John in the wet season—and also permits a number of pumps to be operated at once at widely separated points without increasing unduly the number of 440-volt transformer units.

#### Small Pumps Employed

Although water frequently is encountered in the pit, the quantity is not great. Consequently, only two 5-in. and two 2-in. pumping units are installed. Each unit consists of a centrifugal pump with starter and motor mounted on a base carried on steel agricultural-type wheels and equipped with a tow-bar for movement. The motor is protected from the weather by a shield cut from an oil drum. Four wheels are used on the 5-in. pumps and two on the 2-in. units. The 5-in. pumps are equipped with short suction and discharge hoses, the latter connecting into discharge lines made up of lengths of spiral riveted pipe with male and female joints for quick installation and disassembly. On the 2-in. pumps, rubber hose lines are used entirely.

Ditching is a part of the regular operating plan at Little John and is in large part responsible for the relatively small inflow of water into the pit. This ditching and other miscellaneous earth-moving and materials-handling jobs fall to the lot of a 37B utility unit, which can be used either as a dragline or a clam-shell. General practice in keeping water out of the pit is to dig ditches just ahead of the pit to carry the water away to the most convenient escape point.

In addition to the preparation plant, laboratory and auxiliary deep-well pumping and water-storage and settling-pond facilities, the Little John operation is served by an office and scale house, garage and gas station, warehouse, oil house, wash house and a 54x80-ft. steel-and-hollow-tile machine shop equipped to handle practically any repair or fabricating job which may be encountered. Operations at Little John are under the immediate supervision of L. H. Sherwood, with George Loveall as pit foreman, Gilbert Headley as preparation-plant foreman and Harold Exline as mining engineer. B. E. Lundblad, Indianapolis, is vice-president of the company; William H. Stewart, Linton, Ind., is general superintendent, and R. G. Baughman, Linton, is chief engineer.

General view of the Little John pit. The white streak across the pit behind the stripping shovel is white top.



# SAFETY PRINCIPLES

## + Embodied in Operating Program

### At Republic's Northern Mines—I

By J. L. HAMILTON

*Safety Engineer, Northern Coal Mines  
Republic Steel Corporation  
Uniontown, Pa.*

**T**HAT working safely need not penalize production has been proved at the "Northern coal mines" of the Republic Steel Corporation in western Pennsylvania. With an output per man employed comparing favorably with other operations in the same districts, this group of mines has been awarded a certificate of honor by the Joseph A. Holmes Safety Association for producing a total of 4,439,052 tons of coal between Nov. 13, 1934, and Dec. 30, 1936, without a single fatality, working 6,077,265 man-hours. The coal was all hand-loaded and 71 per cent of the output was from pillars in coal averaging 90 in. in thickness. Recent awards to individual mines in the Northern group include: Russellton, year 1936, for mining 931,833 tons without a fatality or a permanent disability, with an exposure of 1,236,540 man-hours; Martin, year 1936, for mining 173,690 tons with only one lost-time injury from an exposure of 237,600 man-hours.

#### Management Backs Safety

Back of these records and underlying the safety program of the Republic Steel Corporation is acceptance by the management of the principle that safety starts at the top. Consequently, the management of these properties has taken upon itself the responsibility for initiating and carrying on safety work, creating and keeping alive interest in safe working methods among mine employees, developing safe operating practices, and keeping mines and equipment in safe working condition. Marked improvement in the injury record in 1935 and 1936 (Table I) reflects this philosophy.

Six operations comprise Republic's Northern group of coal mines,

i. e.: Russellton, with a rated daily capacity of 4,000 tons; Indianola, 2,750 tons; Davidson, 1,500 tons; Trotter, 1,500 tons; Republic, 1,500 tons; Brownsville Junction, 1,500 tons. Russellton and Indianola operate in the Thick Freeport seam in Allegheny County. The others are opened in the Pittsburgh seam in the Connellsville coke region, Fayette County, Pennsylvania. Thickness of the seam at Russellton and Indianola, both shaft operations, varies from 6 to 7 ft. Average thickness of the cover at these operations is

ranges from 7 to 9 ft. Thickness of the cover varies from zero to 650 ft., with the maximum at Republic mine. The seam in all cases is overlaid with drawslate varying from 10 to 18 in. in thickness, followed by a "wild roof coal" averaging 1 ft. in thickness. From 6 in. to 1 ft. of top coal is left up for protection. Careful timbering is a necessity at all times.

Except for certain sections where rooms were driven on short centers years ago, mining at the Connellsville operations is based as a general

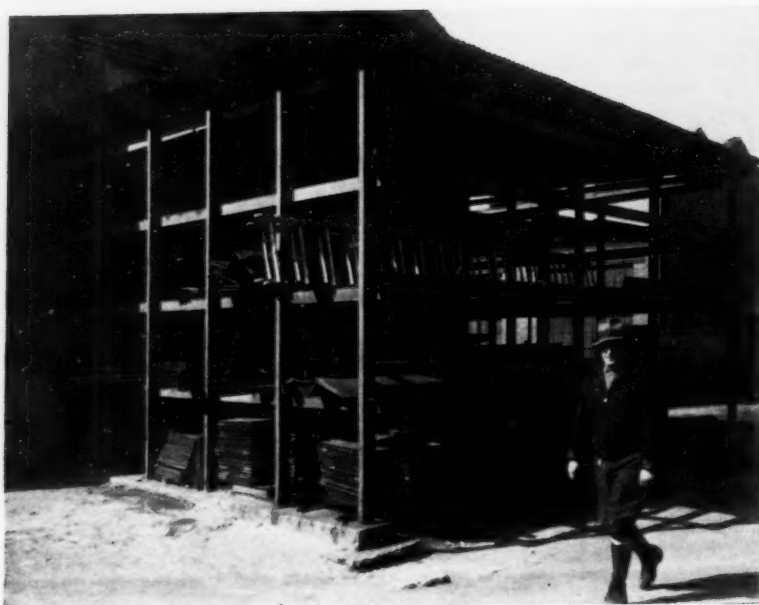
Table I—Safety Record, Northern (Pennsylvania) Coal Mines, Republic Steel Corporation, 1932-1936, Inclusive

	1932	1933	1934	1935	1936
Fatalities .....	1	1	4	0	1
Permanent partial disabilities..	1	..	2	3	0
Lost-time injuries.....	50	65	143	85	85
Days lost from above.....	8,640	8,660	30,783	6,886	9,786
Frequency rate.....	54.78	54.59	60.18	31.84	27.58
Severity rate.....	9.46	7.26	12.95	2.58	3.18
Hours worked.....	912,732	1,192,882	2,376,149	2,669,304	3,082,180
Tons produced .....	666,013	832,769	1,657,039	1,940,447	2,277,219

about 275 ft. The seam at Russellton is overlaid, with the exception of one section, with cannel coal, which is left up and makes a fairly good top. The immediate roof at Indianola is a slate varying from weak to fairly strong in character, requiring care in timbering. About 1 ft. of top coal, as a rule, is left up for protection.

All mines in the Connellsville region are shaft operations with the exception of Brownsville Junction, a drift opening. Thickness of the Pittsburgh seam at these mines

rule on dividing the coal into approximately 68-ft. square blocks by 12-ft. rooms and crosscuts on 80-ft. centers. These blocks usually are mined by pocketing through on the gob side, leaving, as a rule, an 8-ft. wall of coal against the gob, which is removed after the pocket is driven through. In some cases, pillars are open-ended. At Russellton and Indianola, rooms about 20 ft. wide are driven up on 60-ft. centers, leaving 40-ft. room pillars, which are brought back on the pocket-and-stump plan. Pocket width is 18 ft. and stump



Orderly material storage is an aid to safety and efficiency.

width is 7 ft. As long pillar lines as possible are maintained at all times, and rooms are driven only as required by the advance of the break line. As noted above, pillar coal represents 71 per cent of the output, all produced by hand-loading.

Under the Republic Steel organization plan, responsibility for keeping mines and equipment in safe operating condition and for carrying on the safety work, including first-aid training by key men, is placed in the hands of the supervisory force at each mine, which also is expected to investigate all injuries, with the exception of those in the serious and fatal classes, which are investigated jointly by the mine force and the safety engineer working out of the district office. The mine force also makes out the necessary reports on injuries and administers discipline, when necessary, for infractions of safety regulations.

In addition to providing the moral backing, the duties of the general staff for the Northern coal mines are primarily general assistance in and supervision of the work of the mine staffs, preparation and dissemination of statistics on injuries, the training of foremen, inspection of properties for physical conditions and conformance with safety regulations, and training in mine rescue. Primarily this work heads up in the safety engineer, who reports to the general manager of operations. Operating rules and regulations start with the mine law as a basis, with supplementary provisions to cover local conditions at each of the operations. The supplementary provisions are drawn up

jointly by the men at the mines and the general staff, with advice and assistance from representatives of the U. S. Bureau of Mines and the Pennsylvania State Department of Mines. While many of the regulations are applicable to all operations, an effort is made to take into consideration, as far as possible, the conditions peculiar to each mine, thus giving the regulations the necessary flexibility.

Authorization of the necessary expenditures to make mines and equipment safe is another responsibility assumed by the general staff, not only from the safety standpoint, although that is the guiding principle, but also on the premise that plants and machines in good condition can be operated at the least cost and produce better results. In the mine and equipment maintenance program, good housekeeping and cleanliness are emphasized. Roads, yards, aisles, walkways, manways, tracks and any other passages for either men or equipment are kept clean of refuse or material by periodic inspection and attention, supplemented by stress on the habit of picking up after completion of any task. Places for the storage of all material are provided, the nature of the places varying from racks for steel, pipe, sheets, etc., to bins for small parts and sundries. Underground oil storage is limited to one barrel placed in a masonry room with steel door.

Proper guarding is an essential part of any program for rendering a plant safe, and naturally is a standard practice at Republic's Northern coal mines. Gears, pulleys, belts,

chains and other moving parts on equipment which men must operate or be around are inclosed. Railings are installed along elevated walkways, on stairs, around pits and in similar locations, and railings, supplemented in many cases by screens and doors with locks, are placed around engines, electric generating equipment, hoists, switching and control gear, transformer stations, etc. Shafts are protected by gates and safety chains on both the top and bottom, and cagers on the bottom at hoisting shafts are protected against falling material by screens built down from the brow to a point where cars will just pass under them. At points where manways cross or join with haulageways, barriers are erected so that men are forced to turn to the right or left and cannot step directly out on the tracks. Installation of refuge holes along haulage roads is extended at Republic mines to take in not only main entries but also face (or cross) entries and butt (or room) entries. These refuge holes are normally driven on 45-ft. centers.

#### Trolley Guarding Stressed

Wooden guard boards 4 in. deep are installed along the trolley wire at all points where men or animals must cross or work under the wire. Particular attention is paid to installation of guards at man-trip loading points. All sidetracks are guarded for their entire length. At mines where the coal is gathered by locomotives, the wire is guarded 300 ft. back from the face in developing entries. On entries where rooms are being worked, the guarding is continuous down from the last place at the top of the entry to a point 300 ft. out by the first room turned. In making attachments to trolley wires for lights, small pumps, etc., appropriate clamps must be employed, and in the case of lights a switch must be installed in the positive line for use in replacing bulbs. Where portable lighting sets are employed, such as for aligning track, 3-amp. fuses must be installed in the circuit. Portable tools, extension lights, etc., used on the surface are provided with 3-conductor cables, one conductor being the ground.

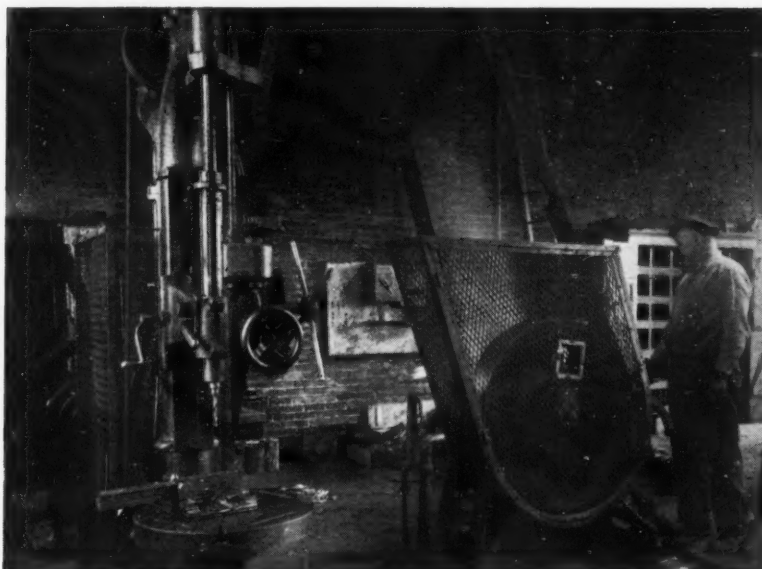
Standards call for placing trolley wire not less than 54 in. over the rail. D.c. distribution circuits are equipped with sectionalizing circuit breakers of the automatic reclosing type. A minimum of 30 in. of clearance between the widest part of the car and the rib from the shaft bottom to the face is called for in the safety standards where roof condi-

tions permit. All switches, cross-overs and other points along the track where men might possibly get their feet caught are blocked with wood.

No equipment known to be defective is placed in service, and if a defect of a dangerous type develops while it is being used, it must be shut down immediately and the foremen and maintenance men notified. Safety appliances on cages are tested once every 24 hours while the mine is in operation and a record is made of the inspection. Cage "dogs" are tested every 60 days and ropes are greased at least once each week and tested for broken strands once every 60 days.

Permissible mining machines and locomotives receive a thorough check each week, primarily to determine the condition of inclosures and cables and for cleaning and repair when necessary. Operators on all locomotives, cutting machines, etc., make daily inspections of equipment in their charge and report items needing attention to the maintenance force. Reels on cable-reel and crab-reel locomotives are equipped with guards, and crab types are equipped with rings in the sides for fastening the cable up when it is not in use. Outside-wheel locomotives are equipped with expanded-metal guards. Steel guards are provided for use on cutter bars when machines are being moved from place, and forged-steel links are used on mine cars to reduce the possibility of injuries from trips breaking apart.

In ventilation practice at the Northern mines, the mine law is



Guards, such as these in the mine shop, are a regular part of the Republic Steel safety program.

adopted as the minimum, with such additional provisions as conditions at each operation warrant. Cinder-block-and-mortar stoppings are standard. Doors are used only when unavoidable, and late installations are equipped with wire-glass windows to enable men about to open them to see whether equipment is approaching on the other side. At all mines generating explosive gas, a number of samples are taken at least once each month in each split, including the outlet, and in the main return near the mine outlet. Maximum methane percentage in any split or in the main return must not exceed 0.5. All mines, regardless of classi-

fication as gaseous or non-gaseous, use electric cap lamps.

All mines falling in the gaseous, dry or dusty classifications (three in number) are rock-dusted throughout to reduce the combustible content on all entries to less than 45 per cent. Samples are taken at least once each month in every split, and entries are redusted by machine when tests show more than 45 per cent of combustible material. In working places, dusting is done by hand by the loaders, and is kept not more than one cut back of the face.

Without interest and cooperation between all departments of an organization, true safety is difficult to achieve. Management at Republic, as indicated above, has made safety a major item in its operating philosophy and as a corollary has taken upon itself the task of maintaining interest among supervisory staffs and employees. This is viewed as a selling job, and successful selling requires advertising, which means in turn not only the preparation of information on what is being accomplished or is proposed to be done, but also its transmission to supervisory forces and employees in an effective form. Emphasis is placed on having a large enough supervisory force to carry on the work and, equally or more important, on fitting members of the supervisory force to train workers properly and make them safety conscious. And finally, as employee interest must be maintained, every effort is put forth to make the workers an integral part of the safety movement. In this way, it is felt, the cooperation necessary for a success-

Switches are blocked with wood at Republic's Northern coal mines. This view also shows roof support at turnouts, trolley guarding and rock-dusting. Cleanliness is insisted upon at all times.



ful safety program can be best obtained.

Safety meetings are relied upon at Republic's Northern mines for the purpose of maintaining interest in safety work and getting information on past accomplishments and proposed actions to supervisory and employee groups. For the purpose of holding such meetings, which are not allowed to turn into operating or production sessions, staff men and workers are divided into four groups: superintendents and department heads, with the manager or general superintendent; foremen; groups of employees on certain shifts or in certain lines of work; and general meetings of all employees.

Manager's meetings are held as often as possible and at least every four months. At these sessions, comparative injury records and costs are discussed and company policies are established. Here an oppor-

foremen at other mines and thus stimulate the necessary competitive spirit.

Republic records are made up on the frequency and severity bases and in this connection severity charts for five different classes of labor, or occupations, are prepared for each mine. Occupations included on these charts (Fig. 1) are miners, transportation men, machine crews, inside daymen, outside daymen, and a composite or total group. These charts give a clear picture of which occupations are giving the most trouble and which group of employees should be given additional instruction and attention. In addition, a chart is made up for the entire group of mines as a whole, which permits drawing comparisons not only between the different groups of men but also between the individual mines and the group as a whole.

Where arrangements cannot be made for night foremen to attend

Foremen are considered the key men in the Republic organization, as they are the point of direct contact daily between the men and management, and in their hands, in no small measure, rests the safety and well-being of the workers. The minutes of the foremen's meetings at each mine are exchanged with the other mines and are carefully scrutinized for new ideas and suggestions.

Meetings of employees on a particular shift or in a particular occupation are held at regular intervals. Each employee is provided with a copy of the safety rules, supplemented by portions of the mine law, and these meetings give the person in charge an opportunity to interpret these rules and laws when necessary. Also, workmen are given an opportunity to express their views on these matters and offer timely suggestions. Safety charts showing the severity standing of the different groups are shown and explained to those present and a competitive spirit is created.

In addition to the above group meetings, a general safety meeting to which all of the employees and their families are invited is held at least once a year at each mine. At a recent meeting, the Bureau of Mines' moving picture "The Coal Loader" was shown, together with a short comedy. These meetings provide an opportunity for brief safety talks, not only to the men but also to the women and children, with the idea that the child of today may be the miner of tomorrow and possibly may benefit by this early attention. The meetings are held at different hours during the day so as to give the workers on all shifts an opportunity to attend. The gatherings are well advertised and at the recent one just mentioned the attendance was 514 men, 217 women, and 203 children. Three assemblies were held on that particular day.

Mine officials having the best safety record during the calendar year are made the guests of honor at a meeting and banquet to which the supervisory forces from all the mines are invited, together with representatives of the State Department of Mines, U. S. Bureau of Mines, and corporation officials. The mine having the best record is given a trophy or loving cup, and competition for this award is keen.

[The concluding instalment of this article, in which first-aid and mine-rescue, employment practices, methods of creating a safety spirit and safe operating practices are discussed, will appear in next month's issue of Coal Age.]

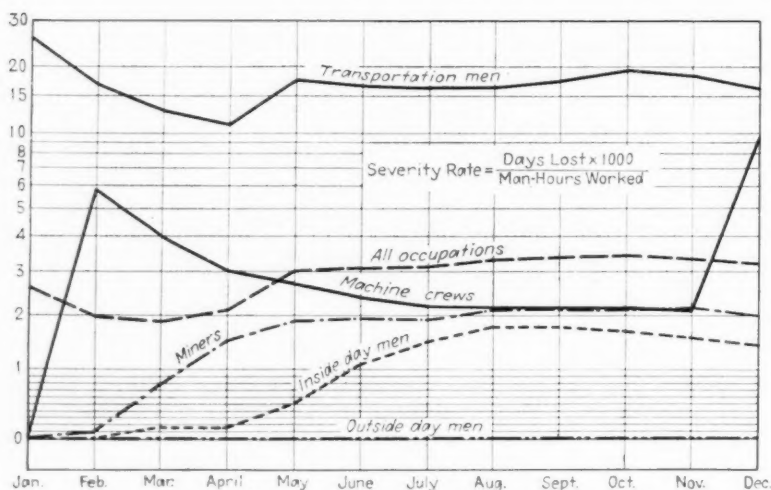
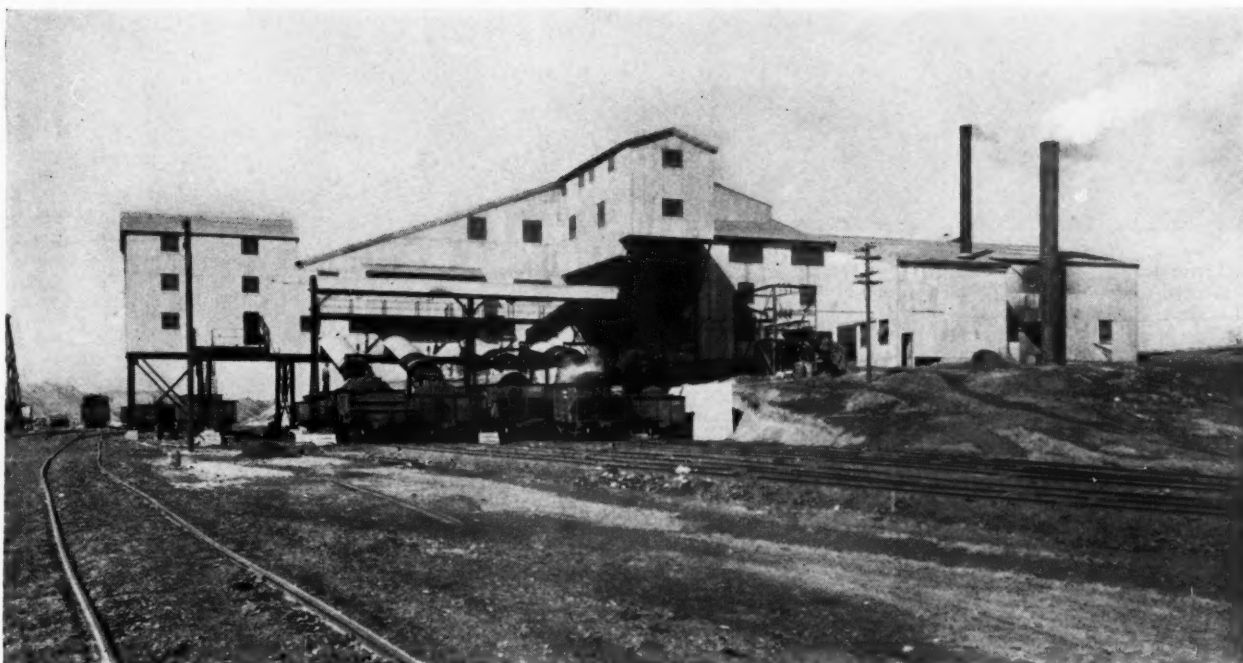


Fig. 1—Charts showing severity rates by occupations point out where attention is needed. The chart shown here is for the Republic mine, year 1935.

tunity is provided for the interchange of safety ideas and suggestions between the operating and engineering heads and valuable hints are frequently made. This meeting also affords an opportunity for the manager to act directly on any recommendations that are made so that work can be commenced without delay.

At the foremen's meetings, which are held at least monthly and are devoted entirely to safety, injuries which have occurred during the month are analyzed and ways and means of preventing recurrence are discussed. Here an ideal opportunity is afforded to acquaint the foremen with how their safety records compare with those of other

meetings of the day-shift men, a separate meeting is held for them. These men are just as important a part of the official family as the day foremen and should be kept instructed at any cost. Too often these men are neglected, with sorrowful results in the form of many serious or fatal accidents on these shifts. Our safety records are constantly kept before the foremen at these meetings, together with actual compensation and accident costs. Too often accidents which have occurred six months, a year, or sometimes several years previous are easily forgotten. Occasionally, these old cases are brought to the attention of the foremen with surprisingly good effect.



Little John preparation plant. Auxiliary crushers are in the small extension at the extreme left, with the stoker-coal plant and bins just to the right of the booms. The large stack at the right is the dryer exhaust.

## ALL COAL WASHED + After Being Crushed to 6 In. At Little John Stripping

**C**OMPLEMENTING the work of the pit and transportation equipment, the preparation plant at the new strip mine of the Little John Coal Co., Victoria, Ill., is designed to efficiently clean and otherwise prepare Knox County No. 6 coal with, as it comes from the pit, a relatively high refuse content. Regulation practice calls for washing all coal from the pit and, in fact, the plant is so designed that no deviation from this rule is possible. Crushing equipment is installed to reduce all coal to a maximum of 6 in., and the entire output, after the large lumps are broken down, is run to two washing units.

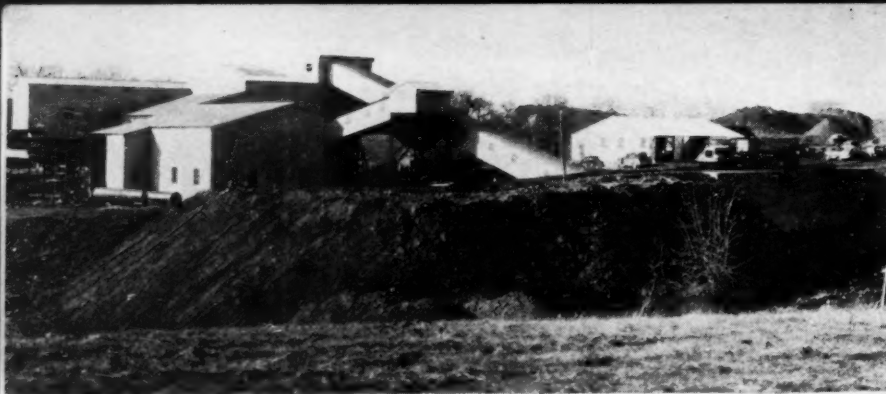
Normally, four sizes are loaded on four tracks. These were, at the time this article was prepared, 6x4-

in. egg, 4x2-in. egg, 2x1½-in. nut and 1½-in. screenings—all placed in the cars by loading booms. The 1½-in. screenings are made by recombining 1½x¾-in. nut and ¾-in. screenings on the nut boom. The latter size, however, can be loaded separately by bringing into service an auxiliary bin over a fifth track. Provision also is made for further screening of the ¾-in. product, making it possible, with the aid of two more auxiliary bins over the fifth track, to make 1½x¾-in. nut, ¾x½-in. stoker coal and ½-in. screenings, or duff. In addition, 1½x¾-in. coal can be loaded on the fourth track. Auxiliary crushers also permit reducing any or all sizes above 1½ in. down to that limit when desired. Heat-drying equipment is installed to bring the

moisture in the screenings below freezing concentrations in cold weather.

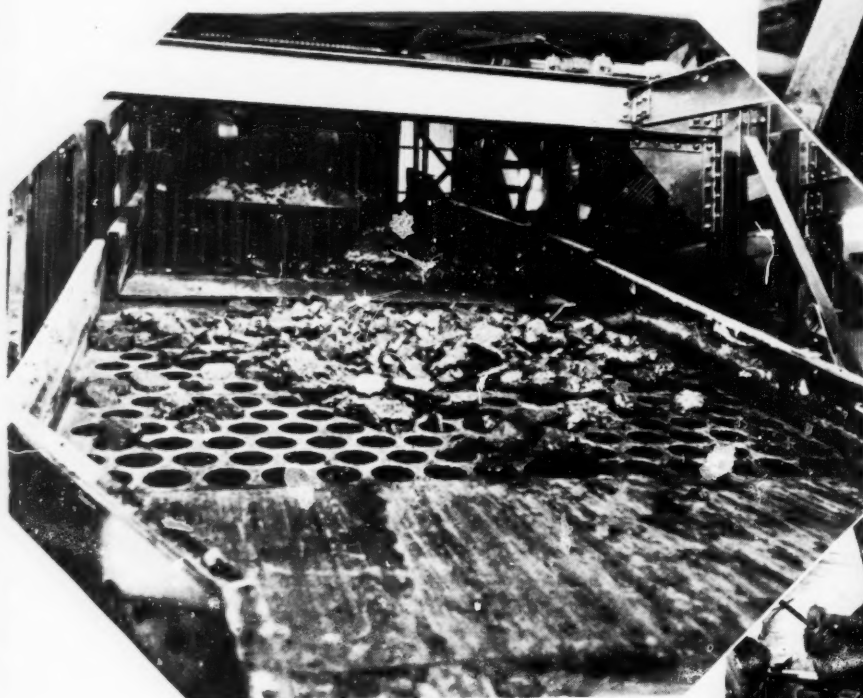
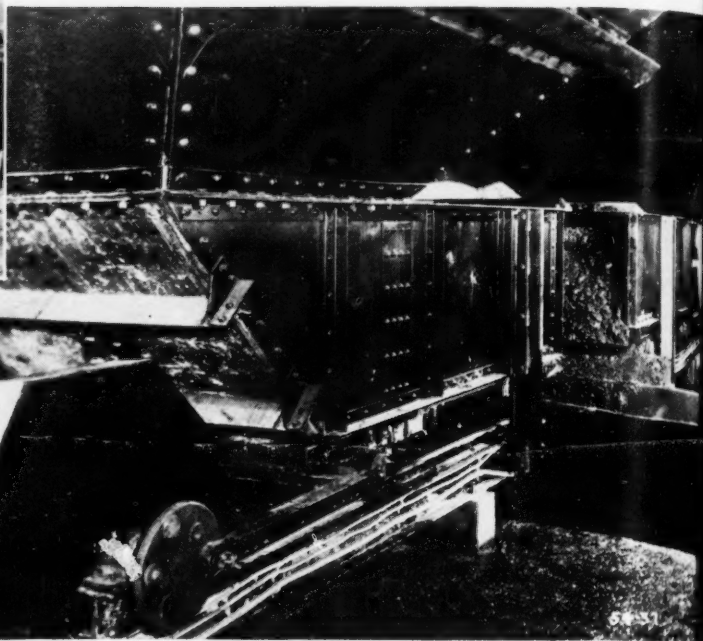
Design capacity of the plant is 400 tons of raw coal per hour, or 2,800 tons per day of seven hours, using two washing units. Provision also was made in the design for the future addition of a third washing unit to increase the capacity to 600 tons per hour. With the two washers now in service, however, the plant has loaded as high as 3,000 tons in seven hours—representing around 4,000 tons of raw mine-run—without appreciable difference in cleaning results.

Little John mine is on the Galesburg & Great Eastern R.R., a short line connecting with the Chicago, Burlington & Quincy at Wataga, Ill., and the coal, distributed jointly



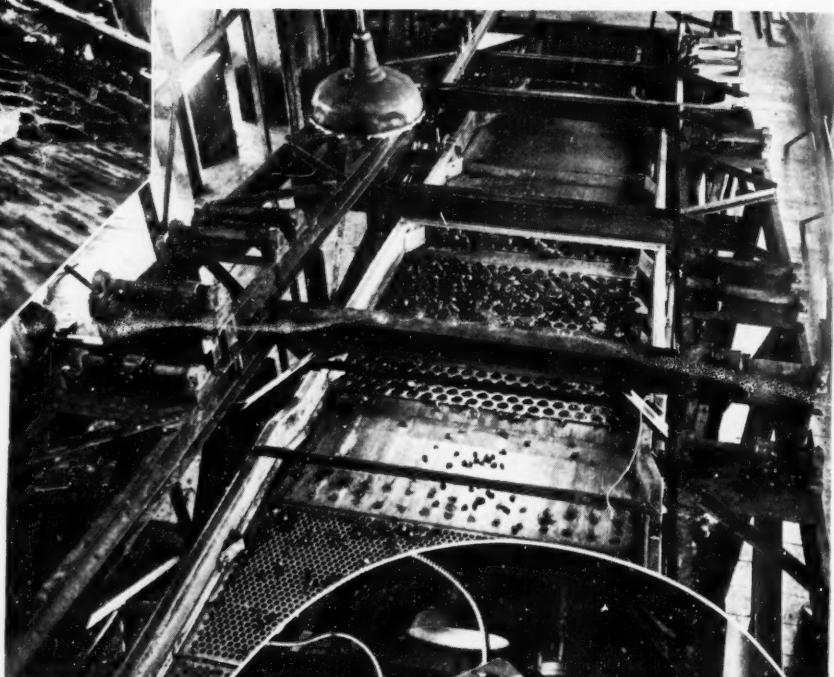
View of the Little John preparation plant from the dump side. The jigs are located under the skylight to the left of the primary shakers. The dryer building, with the stacks ready to install, is in the left foreground. The refuse bin appears by the side of the mine-run conveyor gallery.

Two plate feeders move the coal out of the dump hopper onto the mine-run belt.

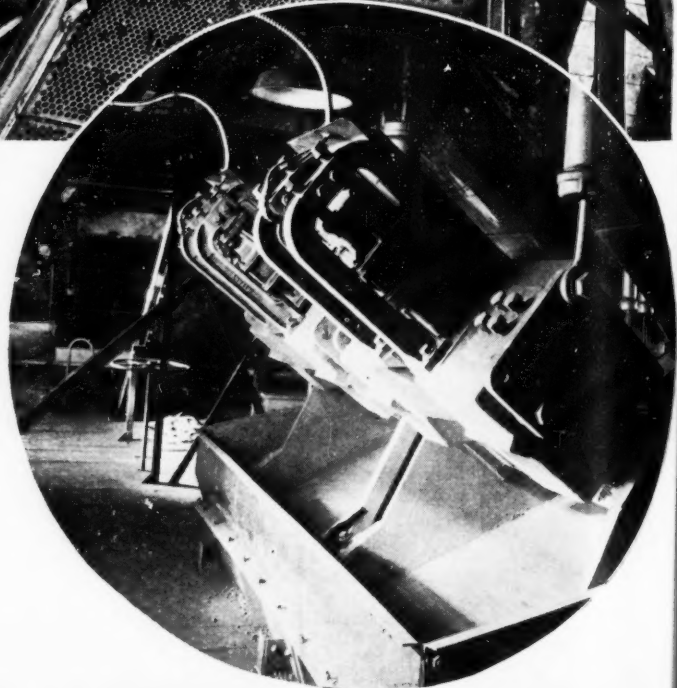
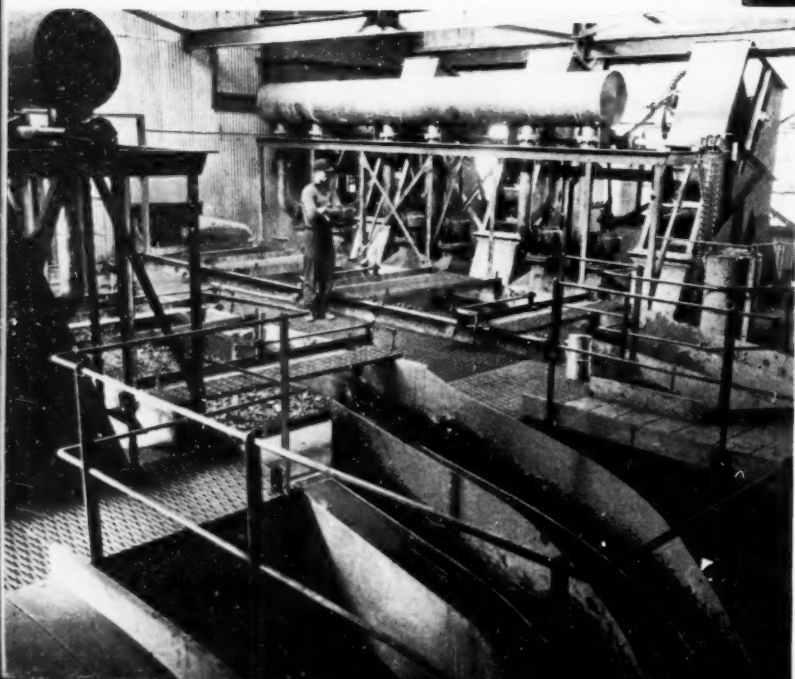


The picking space (not shown) is at the lower end of these primary shakers.

Cleaned coal is sized on two sizing shakers. The boom-operator's station is at the left. Beyond the shakers are the auxiliary crushers.



Two jigs clean the entire product of the Little John mine after it is reduced to a maximum of 6 in.



Two vibrators set over the storage bins prepare stoker coal and duff. In the rear is the vibrator for sizing crushed coal.

by the Central Indiana Coal Co. and the Sterling-Midland Coal Co., moves largely into northern Illinois and the Northwest. The preparation plant was designed with the advice and assistance of R. H. Sherwood, president, and R. G. Baughman, chief engineer, Little John Coal Co., and was equipped and erected by the Jeffrey Manufacturing Co. Three or four years was spent by Mr. Sherwood and his associates in developing the general requirements of the plant and selecting the site. Preparation plant, office and service structures are located in Crozier's Hollow, which at the site of the plant runs roughly north and south. The Galesburg & Great Eastern spur comes down the hollow from the north, and loads are pulled out upgrade from the storage hole below the preparation plant.

In spotting the preparation plant, a major objective was location of as much heavy equipment as possible, particularly the washers, at ground level. Another objective was reduction of excavation to a minimum. Consequently, the plant was located on a small point of land with the gentle slope on the plant side (see illustration, p. 199). The dump hopper was set on the opposite side of the point, with the mine-run conveyor passing over the crest, with very little excavation. Fills were made to serve as approaches.

### Coal Flows Downhill

The main flow of coal through the plant is downhill from the head of the primary shaker to the loading booms. Only in cases where supplementary treatment is accorded is the coal, after it goes onto the primary shakers, carried up from a lower to a higher level, and this only in case of certain sizes. Consequently, outside of the washed-coal sizing shakers, which necessarily are located high enough on supports to provide clearance for railroad cars under the booms, about the only major equipment carried high on steel are the primary shakers and primary and middlings crushers, which feed by gravity, assisted by sluicing water, to the washers. In view of the location of this equipment, the frame in this section of the plant is stiffened by a back brace. From the primary shakers and crushers the main coal flow is left 90 deg. to the washers, right 90 deg. to the sizing shakers, and left 90 deg. to the loading booms.

The No. 6 seam at Little John, as indicated in the companion article beginning on p. 192 of this issue, is characterized by numerous intru-

sions of "white top"—the local name for a soft shale. Over the coal is a thin black slate or lime rock, or both, depending upon the locality, while above these strata are a soft shale and clay and surface material. Partings or bands are infrequent, and when found are thin. Other impurities include casual refuse, mother-coal, or fusain, streaks; pyrites, which occurs mostly in thin plates along the joint planes, and calcite. Average thickness of the seam is 4 ft.

From the float-and-sink standpoint, Little John coal might be classed as fairly easy to clean. On the other hand, however, the quantity of the refuse which must be removed and its character offer a number of problems. Cleaning in the pit is based on the use of a

ing loosens and/or dissolves the white top, thus facilitating its removal from the coal.

As the water carrying the cleaned coal away from the washers naturally contains considerable white top in suspension, provision is made for thorough rinsing with clear water to wash off the film of fine particles remaining on the coal after it leaves the washing units. Incidentally, preliminary wetting and passage through the washers dissolve out practically all of the calcite, which occurs along the bedding and joint planes where the coal naturally breaks in mining or in crushing to minus 6-in. material prior to washing. Still another problem growing out of the large white-top content was clarification of the wash water prior to reuse.

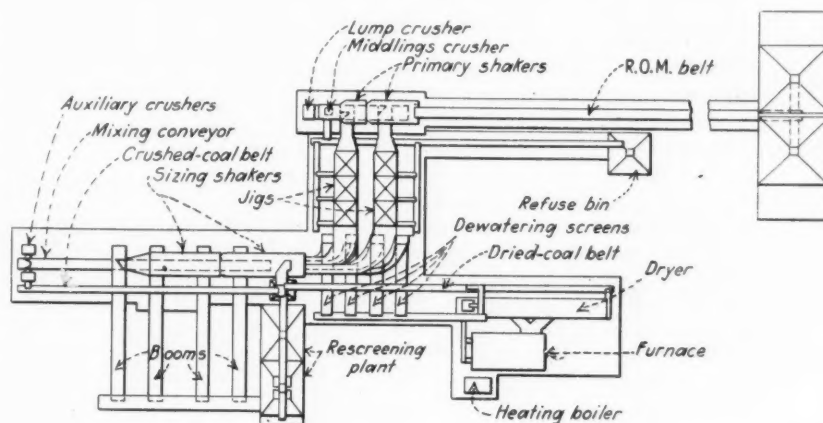


Fig. 1—General layout of the Little John preparation plant.

bulldozer to scrape off the top of the bed when it is uncovered. This bulldozer also is used to root out the white-top intrusions where they are large enough to be attacked in this manner. And occasionally, when the working schedule permits, the white top is dug out by the loading shovel. Small deposits of white top and the remains of the larger deposits, however, are loaded with the coal, thus bringing the refuse content of the raw feed to the preparation plant up to 22 to 27 per cent sink at a gravity of 1.42.

In addition to a satisfactory performance on the other impurities, thorough removal of the white top, which takes on a claylike consistency when moistened, is essential in the production of a commercially salable coal. The white top, however, disintegrates readily when soaked in water, and consequently cleaning is based on thoroughly wetting the coal before it goes to the washers, supplemented by a relatively long passage through the washing units themselves. This wetting and wash-

Raw coal from the pit is dumped into a steel-and-concrete hopper with a capacity of 350 tons. The hopper opening is fitted with grizzly bars having 18-in. clear openings, and lumps larger than this size are broken up by the dumping crew. From the hopper the raw coal is fed onto a 48-in.-wide belt conveyor, 223 ft. long between pulley centers and with a pitch of 17 deg., by two opposed plate feeders. Capacity of the belt is 600 tons per hour at 300 f.p.m. Each feeder also has a capacity of 600 tons per hour, and one or both may be operated, as desired. In addition, each feeder is equipped with a slip-ring motor to permit, if desired, a reduction in speed to regulate the flow of coal to the washers by means of drum-type controllers located at the washer operator's station in the main plant. A third such controller is provided for the slip-ring motor driving the mine-run belt. Loading fingers on the feeders permit the fines to fall on the belt first and thus protect it from the large lumps.

The mine-run belt discharges onto a set of 8-ft.-wide primary shakers designed to separate the feed into 6-in. lump, 6x3 $\frac{1}{2}$ -in. egg, and a 3 $\frac{1}{2}$ -in. resultant. This is done so that, if desired, plus and minus 3 $\frac{1}{2}$ -in. material can be run to separate washers. Actually, however, the entire 6x0-in. feed (after the large lumps are crushed) is split evenly between the washing units. Provision also is made for operating only one washer at a time, if desired. In addition, the plant also is designed so that in the future, if conditions should warrant it, the 6-in. lump can be taken to car-loading equipment or a domestic bin. At present, however, this size is crushed.

The lower end of the lower primary shaker is provided with space for four pickers on 6-in. lump. Picking chutes are arranged so that two products can be removed: i.e., pure refuse, which goes to the refuse belt, and middlings, which drop into an American ring-roll crusher for reduction to minus 2-in. prior to inclusion in the feed to the washers. Picked 6-in. lump is discharged over the end of the shaker into a Jeffrey 30x45-in. single-roll crusher with extended shoe and extra-long (special) teeth to break the lumps to 6 in. with a minimum of fines. Roll speed is 50 r.p.m.

The feed to the washers under the system just described therefore consists of minus 6-in. coal separated out of the raw mine-run, crushed 6-in. lump, and crushed middlings (coal containing impurities removable by crushing). The material falls onto a Jeffrey-developed 5-ft.-wide scraper conveyor (100 f.p.m.) equipped with gates arranged so that not only a uniform

quantity but also a uniform size of material is fed to each washer through individual flumes. As the coal falls into the flumes it is thoroughly wetted by streams of water which also move it along to the washers.

All coal at Little John is cleaned in two three-compartment Jeffrey Baum-type jigs with adjustable screen plates, differential pulsion valves, "fish-float" reject controls, and other regulatory features. Each jig is equipped with three refuse elevators, the first and second with capacities of 30 tons per hour each and the third with a capacity of 25 tons per hour. Jig washing compartments are 7 ft. wide and the effective jig screen surface is 126 sq.ft. each. The valve arrangement permits the washing bed to be opened up and held an appreciable length of time to permit separation of the refuse, and then, upon the release of the air pressure, the bed is given a relatively hard tug to pull down the fine particles of white top and other refuse.

#### Ash Cut to 6 Per Cent

Results indicate an ash content of close to 6 per cent in the 1 $\frac{1}{4}$ -in. screenings shipped, with a refuse containing approximately 3 per cent of material floating at 1.42. At the time this article was prepared, the ash content of the screenings was varying from 5.85 to 6.05 per cent. Refuse from the jig is discharged onto scraper-type conveyors which carry it to the main refuse belt, where it is combined with the pickings from the lump table. Partial dewatering of the refuse and removal of some of the fine material is accomplished by bar-screen sections with  $\frac{3}{8}$ -in. openings in each

scraper-conveyor trough. Water and fines through these screens drop directly into the sludge tanks beneath the jigs.

From the jigs the coal flows through flumes and over a stationary dewatering screen to the main sizing screens. The dewatering section consists of a 6-ft. section of screen plate with  $\frac{3}{4}$ -in.-diameter holes which take out the major portion of the wash water and part of the fines, the whole going to the minus  $\frac{3}{4}$ -in. dewatering screens.

Two 8-ft.-wide shaker screens balanced against each other and having a capacity of 540 tons per hour constitute the sizing screens. The upper screen operates at 175 strokes per minute and the lower at 140 strokes per minute. The upper deck of the upper screen is fitted with approximately 224 sq.ft. of 1 $\frac{1}{4}$ -in. perforated plate, with 184 sq.ft. of  $\frac{3}{4}$ -in. perforated plate on the lower deck. Four clear-water spray lines with  $\frac{3}{8}$ -in.-diameter nozzles about 1 ft. apart are installed over the upper deck to rinse off the entire jig output. Two additional spray lines on the lower deck further rinse the 1 $\frac{1}{4}$ x $\frac{3}{4}$ -in. fraction. This latter size receives its primary dewatering on the lower deck, the  $\frac{3}{4}$ -in. fines and water flowing to the  $\frac{3}{4}$ -in. dewatering screens noted above. Additional dewatering of the 1 $\frac{1}{4}$ x $\frac{3}{4}$ -in. size, which can be loaded separately or combined with the  $\frac{3}{4}$ -in. material after dewatering or drying, or both, is provided by a degradation screen with  $\frac{1}{4}$ -in. openings in the back chute to the screenings (or nut) boom.

Plus 1 $\frac{1}{4}$ -in. coal from the upper shaker, where all the rinsing takes place, flows onto the upper deck of the lower shaker, which is fitted with 112 sq.ft. of 4-in. perforated

Fig. 2—Flowsheet, Little John preparation plant

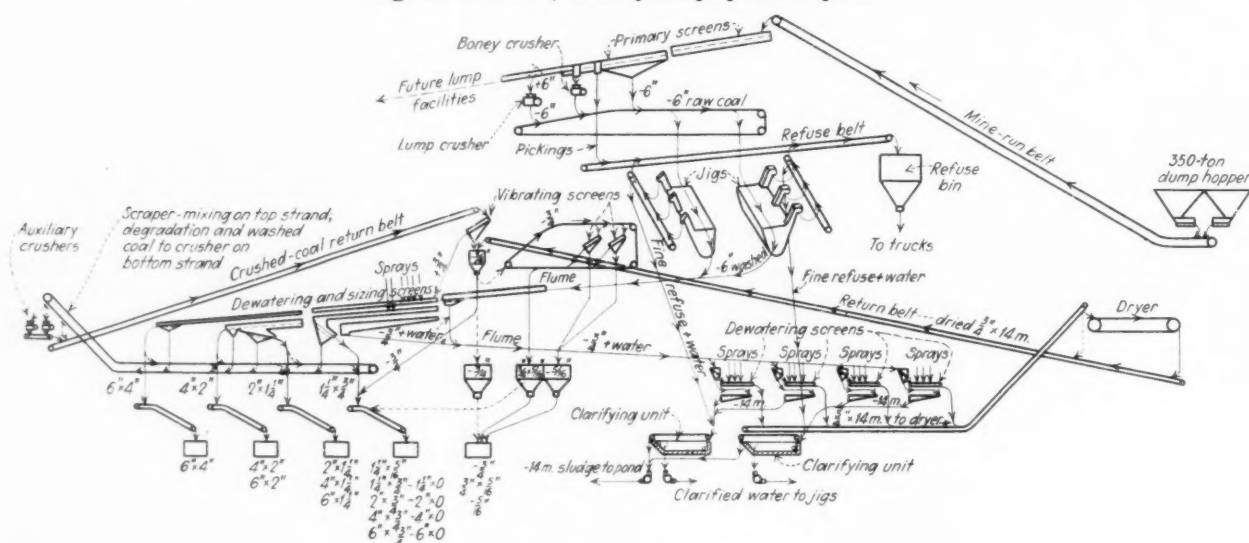


plate for making 6x4-in. egg, which passes over a degradation section with  $1\frac{1}{4}$ -in. perforations and off over the end onto the 6x4-in. egg boom. The lower deck of the lower shaker is fitted with 112 sq.ft. of screen plate also, with 2-in. perforations for making 4x2-in. egg and  $2\times1\frac{1}{4}$ -in. nut. The former is discharged over the end of the deck, after passing over a  $1\frac{1}{4}$ -in. perforated degradation screen, onto the 4x2-in. egg boom. The  $2\times1\frac{1}{4}$ -in. nut through the lower deck is carried to the appropriate nut boom by a back chute fitted with a degradation screen having  $\frac{3}{4}$ -in. perforations.

to a 36-in.-wide crushed-coal belt conveyor, 94 ft. long between centers, which carries the crusher product back up to an auxiliary screening installation above the feed end of the washed-coal sizing shakers. The auxiliary screening plant includes a Jeffrey-Traylor all-electric vibrating screen with two No. 5 power units for separating the crushed coal into plus and minus  $\frac{3}{4}$ -in. fractions, the former going to the sizing shakers for final separation into the various products shipped.

The minus  $\frac{3}{4}$ -in. coal from the vibrating screen falls into a col-

an ample supply of water for sluicing the material which passes through the screens back to the sludge tanks. Each dewatering screen is fitted with three rows of sprays near the feed end.

Dewatered coal from the dewatering screens is discharged into a scraper-type collecting conveyor which carries the coal to a heat dryer or to a bypass to the belt leading back up to the  $\frac{3}{4}$ -in. collecting hopper. Minus  $\frac{3}{4}$ -in. coal at Little John is dried, particularly in cold weather, in a 60-in. x 36-ft. D-L-O dryer having a capacity of 120 tons per hour. Heated air at approxi-

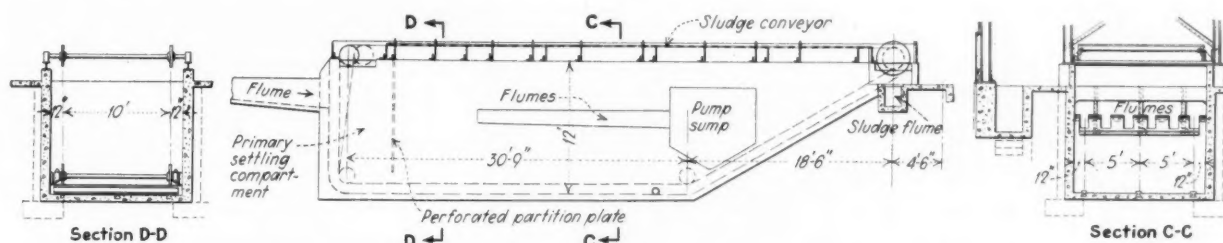


Fig. 3—Details of the sludge tank and clarification system used at Little John.

The mixing conveyor at Little John is located under the sizing screens, with an elevating section extending out beyond to the secondary crushers. On the top run of the conveyor, which is of the scraper type, coal may be brought back for loading mixtures of two or more sizes, depending upon the mixture, on the 4x2-in. egg,  $2\times1\frac{1}{4}$ -in. nut, and  $1\frac{1}{4}$ -in. screenings tracks. On the bottom run, any or all sizes larger than  $1\frac{1}{4}$ -in. can be taken to the two secondary crushers, one on either side of the conveyor discharge. The bottom run of the mixing conveyor also receives the degradation from the sizes produced on the sizing shakers. Normally, the degradation is allowed to pile up in the conveyor, which then is inched ahead to provide new storage space. This process is repeated until crushing is called for, whereupon the degradation goes with the sized coal to the crushers. Provision is made, however, for operating the mixing conveyor for degradation alone, bypassing the fines to the crushed-coal belt through a gate ahead of the crushers.

The secondary crushers—single-roll, 30x45 in.—are specially designed for crushing with a minimum of fines and have an aggregate capacity of 310 tons per hour. They are adjustable for crushing to any size down to  $1\frac{1}{4}$ -in., and one crusher can be operated without the other. From the crushers the broken-down coal is fed by a 48-in.-wide belt feeder, 14 ft. long between centers,

lecting hopper to which all coal of this size made in the plant is brought. From this collecting hopper the  $\frac{3}{4}$ -in. size may be run to the screenings boom, chuted to the auxiliary loading bin over the fifth track, or conveyed to the rescreening plant. The rescreening plant, as noted above, is designed to produce a stoker coal and fine screenings, or duff. From a scraper conveyor from the collecting hopper the  $\frac{3}{4}$ -in. coal is discharged onto two Jeffrey-Traylor screens in parallel for separation into  $\frac{3}{4}\times\frac{5}{16}$ -in. stoker coal and  $\frac{5}{16}$ -in. duff. Both sizes are stored in individual 75-ton bins over the fifth track for subsequent loading. Thus, on the fifth track, three sizes can be loaded, one at a time, from the various storage and loading bins.

As previously stated, minus  $\frac{3}{4}$ -in. washed coal from the dewatering and fine-coal screens ahead of and on the upper sizing shaker is sluiced to dewatering screens. Dewatering of the  $\frac{3}{4}$ -in. coal at Little John is done on four 4x20-ft. single-deck Nordberg-Symons horizontal vibrators, which remove the fines and reduce the moisture content to about 12 per cent. The feed end of each vibrator is fitted with 14-mesh cloth and the discharge end with  $\frac{3}{4}$ -mm. wedge-wire sieves. The feed box ahead of each screen also is equipped with  $\frac{3}{4}$ -mm. wedge wire in the bottom to unload as much water and fines as possible, and lines are carried from these boxes to the discharge end of each screen to insure

mately 800 deg. F. is supplied by two "Firite" stokers fed with wet  $\frac{3}{4}$ -in. screenings. The dryer reduces the surface moisture on the  $\frac{3}{4}$ -in. coal to about  $3\frac{1}{2}$  per cent, and when this dried fraction is mixed with the wet  $1\frac{1}{4}\times\frac{3}{4}$ -in. coal to make  $1\frac{1}{4}$ -in. screenings the surface moisture in the mixture normally is about 5 per cent.

Water and fines from the dewatering screens flow back to two clarification units, each consisting of a concrete tank approximately 12 ft. wide, 9 ft. deep and 34 ft. long, with the necessary conveying and skimming equipment, etc. The tanks are built into the jig foundations. Before entering the tanks proper, the water carrying the fines flows into a compartment designed to quiet it and distribute it equally to both clarification units. Velocity of the water through the tanks is approximately  $7\frac{1}{2}$  f.p.m. The main portion of each tank (Fig. 3) is equipped with skimmer flumes providing an extremely long overflow edge, thus keeping the depth of the water flowing over each to a minimum and consequently insuring that only the clearest water is recirculated to the jigs.

Fines are removed from the bottoms of the tanks by scraper conveyors operating at 6 f.p.m. and having a capacity, at that speed, of 6 tons per hour each. Opportunity for dewatering the fines is afforded as they are carried up the sloping discharge ends of the tanks. Fines

removed from the tanks are sluiced to a sludge pump by the overflow from one of the constant-head tanks for the jigs. The sludge pump puts the sludge and water over a point into a settling pond in an adjacent hollow through Wyckoff wood line protected from frost. In the hollow, the sludge is discharged behind a dam made of woven wire and straw, which retains the fines but permits the water to flow away. A constant-level valve is provided to keep the water in the sludge tanks at a fixed level at all times.

From the sump compartments of the sludge tanks the clarified water is elevated by Allis-Chalmers 12-in. centrifugal pumps to constant-head

tanks, one for each jig, set 10 ft. above the washing units. The overflow from one tank, as noted above, is used to sluice out the sludge. The overflow from the other constant-head tank returns to the sludge tank. Locating the sludge tanks under the washers also facilitates cleaning out the jig hutches—usually once a week. As a rule, the water is run out of the tanks and the system recharged with fresh water once a week also.

The quantity and character of the white top make thorough rinsing of the coal a necessity at Little John. This clear rinsing water, supplied at the rate of 600 g.p.m., assures the necessary make-up water, while the

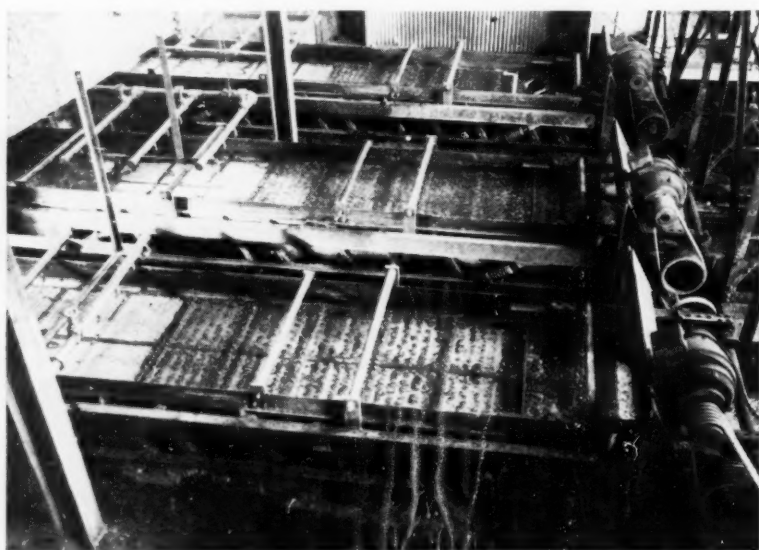
excess over that carried out with the clean coal is pumped to the settling pond with the sludge. Incidentally this excess of water makes it possible to secure a greater degree of clarification of the wash water recirculated. Fresh water is obtained from a 1,530-ft.-deep well equipped with a 300-g.p.m. American Well Works deep-well pump. The pump barrel is placed 360 ft. down in the well.

From the well the water is pumped into a 2,000,000-gal. pond formed by throwing an earth dam across a hollow. By operating the pump sixteen hours each week day and Saturday night, Sunday and Sunday night, sufficient water is obtained to run the plant through the week. A separate supply pump puts the water from the storage pond to the rinsing sprays in the preparation plant at a pressure of approximately 30 lb. per square inch.

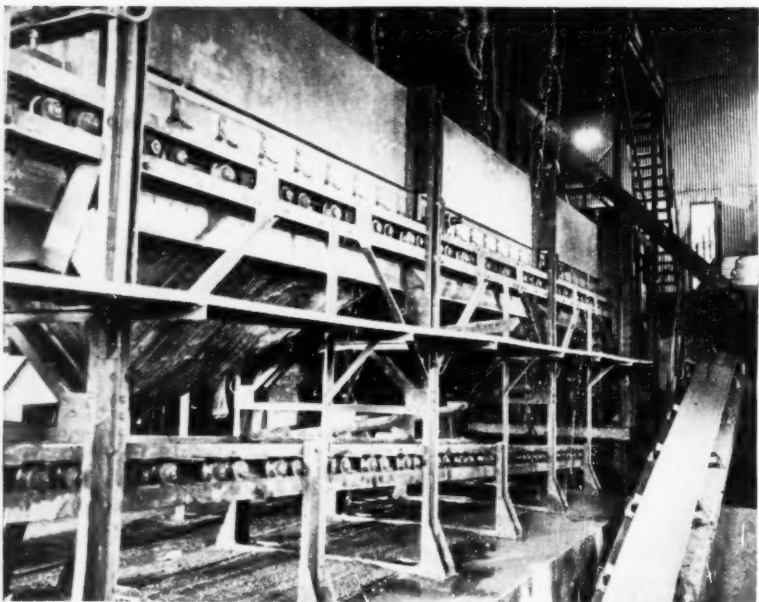
#### Plant Includes 37 Motors

End-dump trucks are employed in refuse disposal. These trucks haul the refuse from a 50-ton bin, to which it is brought by a 24-in. belt conveyor. The bin is equipped with a cast-iron clamshell gate. The trucks haul to the nearest available space, and the dump is leveled down by a Caterpillar RD-7 diesel tractor with Laplant-Choate bulldozer having an 8-ft. blade.

Excluding deep-well, preparation-plant supply and sludge-disposal pumps and miscellaneous motors, the Little John preparation plant is operated by 37 440-volt three-phase 60-cycle motors, furnished, with a few exceptions, by Allis-Chalmers. Aggregate horsepower of these motors is 830. Both power and light circuits—the latter 110 volts—are installed in flexible conduit, except that rigid conduit is used around walkways and drives. All controls are centralized in two General Electric control cabinets, one on the jig operator's floor and the other in the boom-operator's quarters over the tracks. The cabinet on the jig floor has a vertical pushbutton panel, while a horizontal panel is provided on the other so as not to obstruct the view of the booms or tracks. This cabinet also provides for sequence starting and stopping of all equipment except the mixing conveyor; secondary crushers, feeder, crushed-coal belt and auxiliary vibrator; stoker-coal rescreening plant; and the loading booms. The sequence arrangement takes in starting and stopping the feeder and raw-coal conveyor motors, with the drum-type controllers noted above as the means of varying the speed.



Four horizontal vibrators, three of which are shown here, dewater the minus  $\frac{3}{4}$ -in. washed coal at Little John.



This heat dryer removes most of the moisture from the minus  $\frac{3}{4}$ -in. coal. The belt on which the coal returns to the main tippie appears at the right.

Stop buttons for emergency use are installed at convenient points for shutting down all motors.

Both of the control cabinets are dust-tight, and controls, pushbuttons, circuit breakers, selector switches, etc., were completely wired in the cabinets at the factory, leaving the leads to the motors as the only wiring that had to be done in the field. The usual overload and no-voltage releases are provided.

Steel construction with wooden floors and walkways and subway grating on all stairways and around the jigs characterize the plant, which has a 20-gage galvanized sheet roof and 22-gage siding. A dust wall is installed between that portion of the plant housing the primary

screens and the washery building. Skylights aggregating 526 sq. ft. of glass are placed over the picking space and the jig floor, and the plant is built with 144 windows two lights wide and three lights high. General lighting inside the plant is provided by 65 pendant-type fixtures for 220- and 100-watt bulbs. Eight American Blower heating units, receiving steam from a separate heating boiler, are installed, two at the primary screens, four in the washery building and two in the sizing-screen gallery. These units are designed to raise the temperature of the building 65 deg. F.

Operation of the Little John preparation plant is controlled by means of float-and-sink tests on the washed

coal. By a series of preliminary tests, the ash corresponding to the various percentages of sink in the coal is determined and charted, after which determination of the ash within close enough limits for control purposes is made by running a float-and-sink test and then picking off the chart the corresponding ash.

Fourteen men comprise the operating force for the Little John plant, as follows: four pickers, one jig operator, one boom operator, one oiler, one sludge-tank attendant, five ground men, and one dryer operator and heating-system fireman. Refuse is handled by two truck drivers, a bulldozer operator and a gate operator on the refuse bin.

## GLEN LYON BREAKER + Establishes Precedents In Cleaning and Lighting

By W. E. WEINECK

*Superintendent, Glen Lyon Colliery  
Susquehanna Collieries Co.  
Glen Lyon, Pa.*

**T**O PRODUCE a coal of exceptional quality, the Susquehanna Collieries Co. has remodeled its Glen Lyon breaker, in Luzerne County, Pennsylvania, installing three Menzies cones, two of which wash stove, nut and pea together and one cleans buckwheats Nos. 1 and 2; a Hydrotator washes buckwheats Nos. 3 and 4. As other breakers of the company can supply the market with all the egg and broken coal it can absorb, no size larger than stove is made at this breaker.

The finished product is sprayed with spring water as it passes over the lip screens for loading, and the washing water also is carefully neutralized with lime so as to prevent staining the coal, as well as to eliminate corrosion of screens, chutes and other parts of the breaker. In a short time, enough fresh water for washing the coal will be obtained from a spring-water reservoir, thus eliminating costs of mine-water treatment and purchase of spring water and providing an inexpensive non-corrosive cleaning medium.

Screen jackets with Perriser treads are used in the screening of No. 4 buckwheat. The breaker is lighted by an artificial system that simulates the light of the sun.

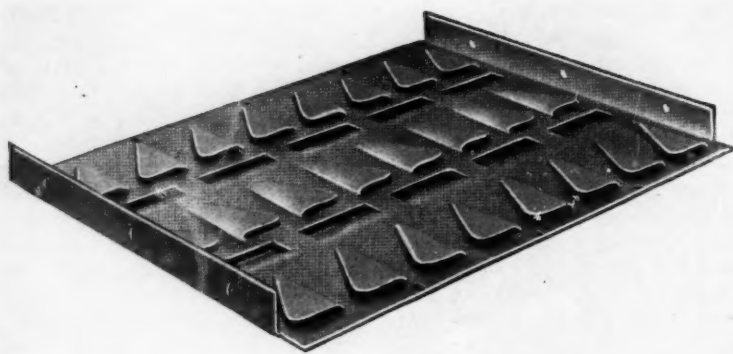
Glen Lyon breaker is predicated on a production of 2,800 tons per day of seven hours, which the mine is now producing. This comes from three openings: No. 6 tunnel, No. 4 shaft, or Stearns, and No. 6 shaft. The coal from the first two is dumped at the foot of the breaker and is lifted to the top of that structure by a double-chain flight conveyor with 9-in. Wilmot chains. That from No. 6 shaft arrives in cars at the top of the breaker.

All this coal is separately discharged on three modified Whiting dumps. With this arrangement a small truck is provided traveling on a track set below the rails on which the mine cars travel. When the mine car runs onto the dump truck, it

pushes the latter forward with its motion and, proceeding to the edge of the dump, overbalances, upsetting the coal into the chute. When empty, the mine car falls back onto the dump truck, and a connecting rod actuated by a pneumatic cylinder below the car track brings the dump truck to its original position, ready for the reception of another mine car.

Thus dumped, the coal passes to either of two dump, or bull, shakers, lump-and-steamboat coal passing over the top decks, broken coal falling to the second decks for delivery to the No. 2, or broken, rolls, and the egg size falling to the third decks for delivery to the No. 3, or egg, coal rolls. Stove-and-under falls onto hopper decks and goes to the counter-shakers.

Lump-and-steamboat coal goes to a picking table, 4 ft. wide, where five men remove all remaining ref-



use; not much has been left for them to remove, as the coal is cleaned in the mine, either on a picking platform near the mine car or on the floor at the foot of the chute, or in the mine car as it is being filled. Coal from the picking table goes to the No. 1, or lump-coal, rolls to be reduced to broken and under. Thence it is delivered to the top deck of the roller shakers, where it receives a somewhat complete sizing, for these screens not only have to segregate the smaller sizes for the several cleaning operations but also to receive and part the larger sizes so that they can be passed separately through rolls suited to the reduction of broken and egg.

The counter-shakers receiving no coal above stove have only three decks. On these stove-and-under is screened to (1) stove, nut and pea; (2) buckwheats Nos. 1 and 2, and (3) buckwheats Nos. 3 and 4, the three aggregations of sizes which are to be washed separately. All the broken from the No. 1, or lump, rolls is carried along the top deck of the roller shaker and passes to the No. 2, or broken, coal rolls, where, with the broken coal from the second deck of the dump shakers, it is reduced to egg. Egg from the lump-coal rolls is caught on the second deck of the roller shakers and joins the egg from the third deck of the dump shakers at the No. 3, or egg, coal rolls, where it is reduced to stove-and-smaller. The product then returns by the upper lip conveyor to the second deck of the roller shakers, so that if any egg still remains it will be returned to the egg rolls for reduction to stove-and-under.

On the roller shakers, the third deck receives and retains stove, nut and pea; the fourth deck, buckwheats Nos. 1 and 2; the fifth deck, buckwheats Nos. 3 and 4; and the hopper deck, finer sizes. Stove, nut and pea are delivered together to two 12-ft. Menzies cone separators, each

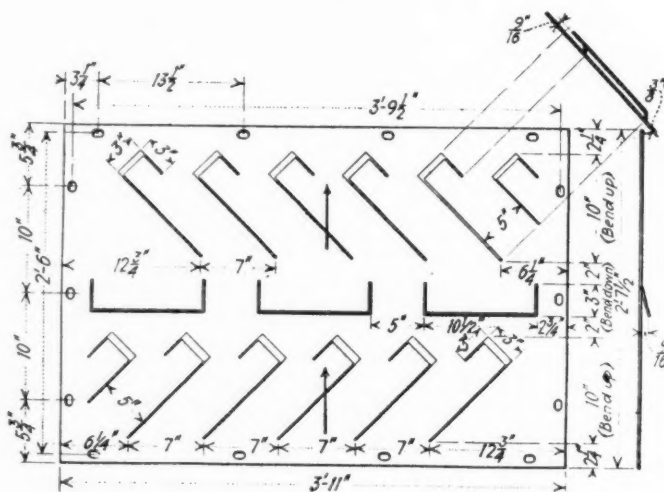
with a rated capacity of 113 tons and an actual capacity of 125 tons. Buckwheats Nos. 1 and 2 together go to another Menzies cone of like capacity, and buckwheats Nos. 3 and 4 travel in company to a Hydrotator. From the several cones the cleaned coal goes to an equal number of water-recovery cones and washed-coal shakers.

The shakers for stove, nut and pea pass marketable stove over the end of the top screen and divert stove flats to one side by means of a picker of local design; marketable nut goes over the end of the second screen, but nut flats are diverted to one side by a Cross-Kerrigan picker.

rows of picking units run across the shaker. Three of these units are shown in Fig. 1. Each unit is formed by cutting two slits in the screen plate at an angle one to the other, thus releasing a small equilateral tongue which can be lifted so that its tip is at a given height above the plate. The jackets are so cut that the points of these tongues are reversed in each row of picking units. The coal in traveling forward under the recurrent shaking impulses is driven against the sides of these tongues, and if any chunk of coal has less than the desired thickness it will, before it reaches and leaves the tip of the tongue, slip under it and fall through the opening.

Experience appears to show that more coal is thus trapped when traveling back relative to the plate than when traveling forward. To make the action more deadly sure, long rectangular pitfalls are provided between the rows of picking units already described. These are made by cutting the plate along the upper edge of the pitfalls and on the two sides. The flap of steel thus released on three sides is bent down so that flats which are thin enough will pass under the jacket, and thicker pieces will wait until the reciprocation again enables them to move forward.

With the Susquehanna company's



**Fig. 2—Sevens-pattern, also with rectangular tongues**

Pickers for the removal of flat material consist of jackets with large openings that will pass coal almost regardless of its horizontal dimensions, but these openings are guarded by plates set at such a level that thin pieces alone can pass under them and enter the openings. Thus thin pieces of coal pass through the screen and are diverted to its side, whereas the more cubical pieces pass to its end. In the Cross-Kerrigan picker several

own design the jackets for flat-coal removal are cut into alternate rows of sevens and sevens reversed, instead of into triangles, or deltas and triangles, or deltas reversed. That is, the slots resemble that figure and its reverse. But the strip of plate, or tongue, thus lifted is not arranged to form a perfect plane but is raised rapidly at its root to give the correct clearance and then is carried almost parallel to the jacket. Hence, the

Buckwheat No. 1 from the top

Stove, nut and pea refuse with their undersize from the domestic-size cones go together to the rock

Rock picked out on the picking table at the head of the breaker travels to the rock rolls and is reduced in size. It then goes with the rock from the rock jigs to a pocket and is lifted by a conveyor to the point of disposal. Tracks are provided on both sides of the coal pockets. The big pea pocket can be emp-

tied from either side, but nut and buckwheats Nos. 2 and 3 are loaded on the inner track and stove and buckwheats Nos. 1 and 4 on the outer track. All these bins except that for pea, which is larger, hold about 80 tons.

It was discovered early that mine water when not washed off the coal discolored the product after a certain length of time, giving the coal a green tint. Though this did not affect its quality, it detracted from its appearance. In consequence, Scranton Spring Brook Co.'s clear water was used for spraying the coal on the lip screens below the bins. The mine water also is neutralized by hydrated lime depositing the ferric hydrate from the treatment on the floor of a flumelike treating tank of 420,000-gal. capacity, used for storing the water. Thus the water is now both non-acid and clear. To eliminate the cost of the 400,000 gal. of spring water purchased monthly and of the lime used for neutralization, a reservoir is being excavated in a big swamp  $1\frac{1}{2}$  miles south of the breaker, which will cover about 42 acres and will store between 100,000,000 and 150,000,000 gal. of water. An 8-in. steel-pipe line will be laid to bring the water to the breaker.

Neutralization reduces corrosion but it does not solve the abrasion problem. To meet this, stainless-steel jackets are used for the sizing of buckwheat No. 1 and all smaller sizes and also for dewatering. Even spring water will corrode plain steel, and, when corroded, coal will refuse to run on it at low pitches. Whenever the breaker is started, plain steel plates have been sufficiently

rustured during the idle interval to prevent the passage of coal. If the plates are pitched enough to remove this difficulty, the coal will run too freely when the plates are polished, causing disintegration of the product. On the other hand, stainless steel soon develops a fine polish, and coal then runs over it with equal rapidity throughout the day. Moreover, the holes in the screens maintain their size and do not block as when made of corrosive and abrasive material. Four years' service has been obtained from stainless-steel chute plates and screen jackets, many times the life obtained where steel, copper or bronze is provided.

About 3,000 g.p.m. of water is used for Robinson sprays on the shakers and make-up water throughout the breaker. This water is circulated through the cone by three 12,000 - g.p.m. Barrett - Haentjens double-suction volute centrifugal pumps working against a 45-ft. head.

Fairmont car retarders are provided for the movement of cars, and the tracks are kept free of ice in winter by steam pipes which run the full length of each track, 300 ft. above the breaker and 600 to 800 ft. below it. Carrier hot-air heaters are used to keep the breakers warm. A heating plant is provided for general purposes including the warming of the bathhouses. Light is afforded by 250- and 400-watt Westinghouse high-intensity mercury-vapor lamps with an intensity of 30 and 40 lumens per watt respectively—about two and a half times that afforded by incandescent lamps. It is asserted that, with this light, visual acuity is increased, also that the lamps have a long life. The longer unit is 13 in.

long and of 2-in. diameter and contains within it a 7-in. tube of  $1\frac{3}{4}$ -in. diameter.

The light from these lamps closely simulates that of daylight, consisting mainly of wave lengths in the violet, green and yellow-green portion of the visible spectrum, but most of it is derived from the green and yellow-green sector to which the human eye is most sensitive.

These lamps are used in connection with 400-watt aluminum reflectors, 400-watt "glassteel" diffusers and 250-watt symmetrical-angle reflectors. The diffuser is a combination of a white porcelain enameled reflector which directs the light downward and a diffusing glass globe that decreases glare and softens shadows.

The 400-watt aluminum reflectors are set about 30 ft. above the cones. They have been tried at a lower level but have not given such good results. "Glassteel" reflectors are used above the shakers, and 250-watt symmetrical-angle reflectors light the machinery. Installation of the new lamps has reduced lamp renewal costs considerably. Light for the picking table is derived from the sun because (1) all the picking is done by day, (2) generous window space is provided, and (3) the breaker at this deck is of a narrow section with the windows on either side closely adjacent to one another and to the picking table.

Power for operation of the colliery and breaker comes from the company's own power plant at No. 7 colliery, Nanticoke, Pa., but a standby connection is provided with the Luzerne Gas & Electric Corporation's service lines.

Glen Lyon Breaker, Susquehanna Collieries Co., Glen Lyon, Pa.



# OPEN-ENDING BLOCKS

## + Cuts Cost and Improves Conditions

### At W. J. Rainey Mines

**D**IFFICULTY in securing complete removal of small stumps, with consequent trouble on pillar lines, was the major factor in a change to the open-end method of mining blocks at the mines of W. J. Rainey, Inc., in the Connellsville coke region of western Pennsylvania. This change-over was inaugurated at the Allison (Pa.) mine in the Rainey group in 1930 and also included a radical revision in face-preparation methods, involving the replacement of air-driven puncher machines with track-mounted cutting and shearing equipment to obtain better working conditions and an improved grade of coal.

All of the Rainey mines, including the Clyde Nos. 1, 2 and 3 (Fredericktown and Clarksville, Pa.), acquired around 1930, have been opened in the Pittsburgh seam. Thickness at Allison and also at Royal mine, Chestnut Ridge, Pa., averages 84 in. In mining, however, 5 to 7 in. of coal is left up in the top and the same thickness down in the bottom. This same practice also is followed at the Clyde mines. Directly above the coal at Allison and Royal is 12 to 14 in. of block, or checker, slate, on top of which is 18 in. of "wild coal." The remaining cover, running up to a maximum thickness of 700 ft., consists mainly of sandstones and shales. Conditions at Royal differ somewhat from those at Allison, however, in that the top is more brittle.

Average thickness of the seam at the Clyde mines is 72 in., of which 10 to 14 in. is left in the top and bottom in mining. Over the coal is 12 to 18 in. of drawslate, above which, in order, are the wild coal and a checker slate. The remaining cover, corresponding in character to that at Allison and Royal, reaches a maximum thickness of about 550 ft.

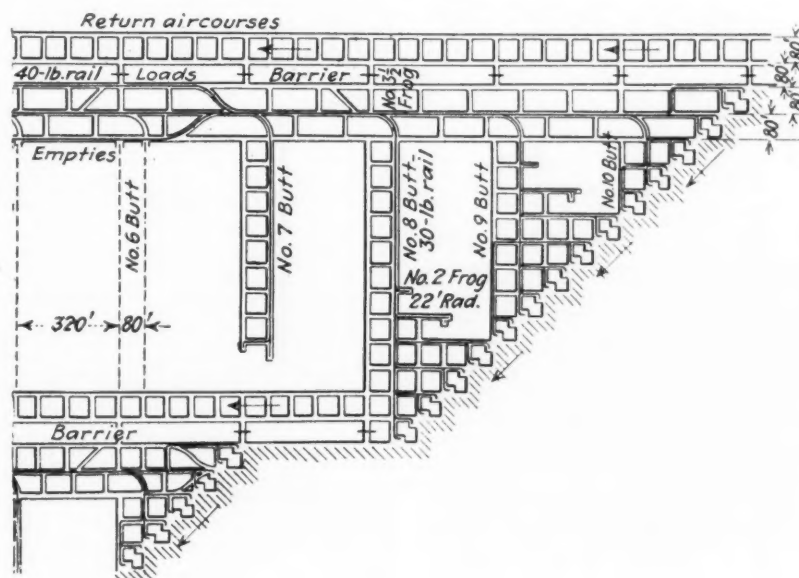
Pillaring on the retreat, establishment of pillar lines as long as conditions will permit and regularity of extraction of blocks to keep each block in step with the general progress of the pillar line are the major objectives in the development plan at the Rainey mines. Normally, the practice is to advance cross or room entries to the boundary or other limit, cutting pairs of rooms through to the preceding entry from time to time to facilitate ventilation and also haulage when the pillar line comes onto the entry. Then the necessary tracks and sidetracks, the type depending upon the expected life of the particular section of entry they are in (see *Coal Age*, September, 1936, p. 362), are constructed and, finally, when the pillar line meets the inby end of the entry,

driving of rooms only as needed and mining of pillars are started.

All rooms and crosscuts are driven on 80-ft. centers to divide the coal into blocks about 74 to 76 ft. square. The same practice is followed, as far as conditions will permit, in driving headings and heading crosscuts, so that, with the necessary minimum of exceptions, all pillar mining, whether in room or entry territory, will be conducted in square or approximately square blocks. This system was standard at the original operations of the Rainey company and was installed at the Clyde mines when they were taken over.

Prior to the change in the method of attacking a pillar, or block, inaugurated, as noted above, in 1930, blocks were mined by driving pockets about 12 ft. wide across the two

Fig. 1—Rooms are driven and pillars are extracted on the retreat at Rainey mines



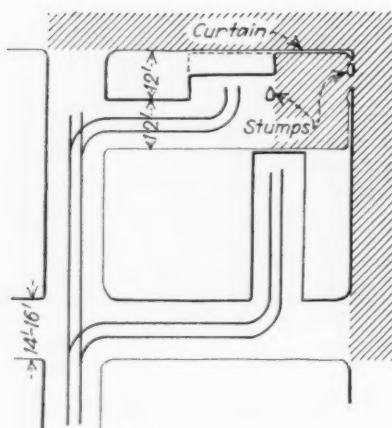


Fig. 2—Pocket-and-stump method of removing a block previously used at the Rainey mines

sides next to the gob and then taking out the 12-ft.-thick fender left next to the worked-out area, repeating the process until the block had been removed, with, in many cases, the exception of the stumps and curtains which were the source of trouble under the old system.

In taking out the fender, the practice was to remove it in lifts 24 or 25 ft. long and 6 ft. deep, as indicated in Fig. 2. With the 6-ft. depth of cut, two such lifts were designed to account for the entire thickness of the fender. Actually, however, the lifts next to the gob seldom were cut through, the thin curtain left in place acting as a guard against intrusions of gob. Also, small stumps frequently were left at the corners for support, much as indicated in Fig. 2. Difficulty in removing or breaking down these stumps and curtains was the major source of trouble on pillar lines.

Failure to secure clean roof breaks as a result of leaving stumps and curtains resulted in weight being thrown ahead on the coal, so that the bottom heaved in working places, requiring grading to keep them accessible. Timbering also was constantly being destroyed, necessitating extra labor for its replacement in addition to extra hazards involved, and the strain on the roof in the working places fractured the top coal and checker slate and caused them to fall, making it difficult to keep the coal clean as it was being loaded. As a means of remedying these conditions, the open-ending system was adopted. This adoption was followed by almost complete disappearance of the former difficulties.

The method of extracting a block by the open-ending system is shown in Fig. 3. As in the earlier system, the block is attacked from the two

sides next the gob. Driving along one side is deferred, however, until work on the other has advanced far enough so that each place always will be separated from the other by not less than 20 ft. of solid coal. Open-end places, in contrast to the pockets of the previous system, are driven 22 to 24 ft. wide. Consequently, each open-end place takes in approximately one-third of the distance across one side of a full-sized block.

The single posts and crossbars distinguishing the previous system have given away to cribs, three-piece timber sets with lagging, and single posts put up with sawed wedges. Before the change-over, only 8- and 9½-ft. round timber or their equivalent were supplied at Allison and Royal, from which the miners manufactured bars, wedges, lagging, etc. Now, the material includes 6-ft. saplings, from which lagging is made, 7-ft. single posts with a minimum diameter of 4½ in., 9½-ft. crossbars not less than 6 in. in diameter, 5x6-in. sawed crib blocks 2½ ft. long, and sawed wedges 6 in. wide and 18 in. long, tapering down from 1½ in. at one end to nothing at the other. Material now supplied at the Clyde mines is the same, except that the posts are shorter because of the lesser seam thickness. This reduction in seam thickness also reduces the output per open-end cut about 10 tons, as compared with Allison and Royal, with a correspondingly higher per-ton cost for the timbering, which is put in on the same general plan at all operations.

In driving an open-end place, a line of cribs is set on the gob side of the place about 18 in. outside the

legs of the timber sets (Fig. 3). Normally, these cribs, which are 2½ ft. square, are set on approximately 6-ft. centers with a single post midway between each pair of cribs. At times, however, depending upon conditions, the cribs are set closer together and the midway posts are eliminated. This latter variation is illustrated in an accompanying photograph made in the Allison mine.

Standards for crib construction provide that they shall be set on about 6 in. of slack coal to permit the roof to settle slowly and facilitate their later recovery. Each crib

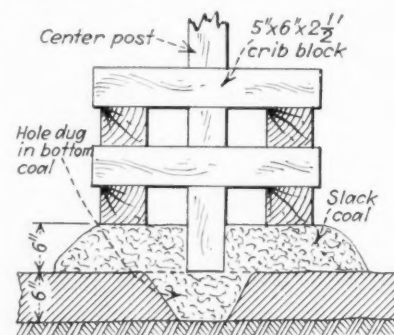
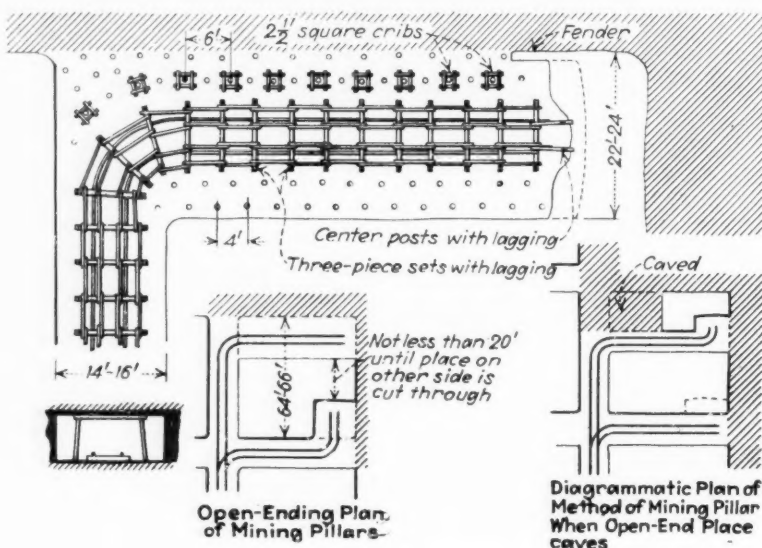


Fig. 4—Showing how cribs and center posts are set on slack coal to permit gradual settlement and facilitate recovery

also must be set around a center post. In placing this center post, the standards prescribe that a hole must be dug in the bottom about 6 in. deep and filled with slack to permit the post to settle and make recovery easier. The center post is used to hold the roof coal and slate in place while the crib is being removed. Recovery of posts and timber sets is

Fig. 3—Details of the open-ending method of mining blocks now used at the Rainey mines, showing method of timbering



based on the use of Simplex post pullers. Knocking out posts or any other structure with an axe, hammer or other tool is strictly forbidden, although a pick may be used to loosen a crib prior to its recovery by removing some of the slack.

Cuts are made about 8 ft. deep, and in making such cuts a thin fender is left on the side of place next to gob until the coal has been loaded out, after which it is picked down. As soon as the fender has been taken out, it is replaced with single posts so that in addition to the crib line supplementary protection on the gob side of a place is assured through a row of single posts set along what was the edge of the block. Two rows of posts on not exceeding 4-ft. centers and with the posts in one row staggered with respect to the posts in the other row normally are set on the opposite side of the place next to the solid coal.

In the case of a fresh cut, the last timber set usually is just far enough from the face to permit the cutting machine to reach the corners without touching the legs. In starting to load out a fresh cut, the miners take out not more than two cars of coal in the center to make room to set the safety posts and lagging. Then loading proceeds until enough coal is out to permit placing the next timber set, after which the process of setting safety posts and lagging is repeated. Additional timber, of course, is placed along the face during loading or back in the place if conditions warrant it.

When an open-end place has been driven across the pillar, such timber as can be safely and conveniently recovered is removed, along with the track and other material, starting at the inby end of the place. Then the place is allowed to cave while the miners move back down the room and start a new place. In addition



Cribs, with their center posts, are set on slack coal at Rainey mines



View of an open-end place in Allison mine showing, left, method of setting cribs. In this place, the midway posts shown in Fig. 3 are replaced by cribs. Three-piece timber sets and lagging protect the space over the track

In addition to the cribbing and posts noted above, the space directly over the track is protected by three-piece timber sets on not exceeding 6-ft. centers. Usually, however, two sets are placed per cut. The top of each leg of a timber set must be set in 6 in. from the end of the crossbar, and the legs must be given a slight batter in from the bottom. Four pieces of lagging, located as in Fig. 3, must be placed between each pair of crossbars. Two safety posts must be set between the last crossbar and the face and lagging run from these posts to the last bar.

to the other benefits outlined above, adoption of the open-ending system has materially reduced the pillar-mining hazard. In fact, not a single fatality has occurred in an open-end place since the system was adopted. One factor in this record is the improved quality and quantity of timbering.

At the Allison and Clyde mines, approximately 95 per cent of the output is machine-cut coal. At Royal, the average is about 81 per cent. Tonnage per loader at Allison and Royal averages close to 13.4 per shift, while at the Clyde

operations, where the coal is lower and consequently the time expended by the miner in deadwork is proportionately greater per ton, the average is close to 10.5 tons per shift.

Allison and Royal coal is cut on the bottom and sheared approximately in the center with Sullivan CLU machines making a cut about 8½ ft. deep. Shearing, however, is impracticable on curves. The machines are equipped with integral drills for putting in the shotholes. In operating the machines where timber sets are close to the face, the practice is to sump in the center for the bottom cut, cut over to one side, deadhead the bar back to the center and then cut the other side. Occasionally, it is necessary to change the position of a timber, and in this case it is done by the machine crew. At the Clyde mines, both top and bottom cutting with track-mounted and shortwall machines is the practice. This results from the variation in types of machines in use at the properties when they were taken over. Eventually, however, cutting practice at these operations will correspond somewhat with that at Allison and Royal.

The general practice is to shoot all sheared places, regardless of width, with two holes, one on either side of the place. Holes are drilled in the top about 18 in. inside the edges of the cut and as nearly straight in as possible. In shooting a 22- to 24-ft. place with two holes, about seven sticks of powder is employed. Under abnormal conditions or in the absence of a shearing cut, the number of holes and the powder consumption may be increased. Holes are loaded and shot by shot-firers, using electric detonators and clay stemming.

# 14TH ANNUAL COAL MINING

## PROGRAM

**Monday, May 17**  
**10 a. m.**

Introducing—C. E. Cowan, vice-president, J. H. Weaver & Co., and national chairman, program committee.  
Bruce G. Shotton, Hendrick Manufacturing Co., and chairman, Manufacturers' Division, American Mining Congress.

### STREAMLINING MINE VENTILATION

H. Landsberg, Geophysical Laboratory, School of Mineral Industries, Pennsylvania State College.

### CUTTING REQUIREMENTS FOR CONVEYOR MINING

J. O. Cree, West Virginia Engineering Co.

### BARRIER PILLARS TO BE LEFT IN MINE

C. S. Blair, vice-president, Black Diamond Coal Mining Co.

I. W. Millar, Tennessee Coal, Iron & Railroad Co.

*Discussion:* M. L. Coulter, chief engineer, Clearfield Bituminous Coal Corporation.

### FLOOD CONDITIONS OF 1936 AS THEY AFFECTED MINING IN THE ANTHRACITE FIELD

John M. Humphrey, Jr., engineer, Lehigh Valley Coal Co.

**2:30 p. m.**

### ADVANTAGES OF SECTIONALIZING POWER BY USE OF AUTOMATIC CIRCUIT BREAKERS

John T. Parker, superintendent, Inland Steel Co.

### COMMUNICATION SYSTEMS IN MINES

W. C. Thompson, New River Co.

### USE OF BATTERY LOCOMOTIVES IN THICK PITCHING SEAMS

A. C. Watts, general superintendent, Utah Fuel Co.

### WAXOLIZED TREATMENT OF COAL

Thomas C. Cheasley, Sinclair Coal Co.

### RECENT METHODS OF BREAKING DOWN COAL AT FACE

O. S. Batten, consulting engineer, Pikeville, Ky.

## The American Mining Congress

*Music Hall, Cincinnati, Ohio*

**May 17-20, 1937**

**Tuesday, May 18**  
**10 a. m.**

### EFFECT OF MECHANICAL VS. HAND LOADING ON DEGRADATION OF COAL

J. G. Crawford, general manager and purchasing agent, Valier Coal Co.

### FACE PREPARATION FOR MECHANICAL LOADING

T. A. Stroup, chief engineer, West Virginia Coal & Coke Corporation.

### EFFECT OF TYPE OF BIT AND BIT FACING ON BUGDUST SIZES

F. F. Jorgensen, manager of production, Consolidation Coal Co.

### ADVANCED MINE-RESCUE TRAINING COURSE OF U. S. BUREAU OF MINES

J. J. Forbes, supervising engineer, Safety Division, Bureau of Mines Experiment Station, Pittsburgh, Pa.

### MINING SYSTEMS FOR EXTRACTING PILLARS

H. L. Griffin, division engineer, Koppers Coal Co.

*Discussion:* R. L. Adams, general superintendent, Old Ben Coal Corporation.

### MERCURY ARC RECTIFIERS FOR COAL-MINING SERVICE

A. L. Lee, consulting engineer, Pittsburgh, Pa.

*Discussion:* A. Lee Barrett, Pittsburgh Coal Co.

**2:30 p. m.**

### SHEARING AS AN AID TO MECHANICAL LOADING

F. Earle Snarr, research engineer, Chicago, Wilmington & Franklin Coal Co.

### TRACK-MOUNTED CUTTING MACHINES WITH MOBILE LOADERS

P. D. Everly, preparation superintendent, Island Creek Coal Co.

Walter F. Clarke, general superintendent, Independent Coal & Coke Co.

### CLEANING STRIP-MINED COAL (Little John Coal Co.)

Ray Baughman, chief engineer, Central Indiana Coal Co.

### RESULTS FROM OPERATION OF MINE POWER PLANT

C. M. Garland, consulting mining engineer, Chicago.

### PREPARATION PROBLEMS IN ANTHRACITE FIELD

W. H. Lesser, electrical-mechanical engineer, James H. Pierce Management.

**Wednesday, May 19**  
**10 a. m.**

### MECHANICAL LOADING ON CONVEYORS

John C. Lowry, Jr., assistant manager of mines, West Virginia Coal & Coke Corporation.

*Discussion:* Earl J. Jones, Zanesville, Ohio.

T. E. Jenkins, president, National Fuel Co.

### BRINGING SAFETY HOME TO THE MINER

Dan Harrington, chief, Health and Safety branch, U. S. Bureau of Mines.

*Discussion:* Otto Herres, vice-president and general manager, United States Fuel Co.

### COAL PREPARATION IN ALABAMA

B. W. Gandrud, supervising engineer, Southern Experiment Station, U. S. Bureau of Mines.

### TRANSPORTATION BY UNDERGROUND CONVEYORS AND AERIAL TRAM

R. A. Suppes, superintendent, Brule Smokeless Coal Co.

# CONVENTION AND EXPOSITION

2:30 p. m.

## HAND LOADING ON CONVEYORS

Longface Mining—Eric George, superintendent, Glen White mine, Koppers Coal Co.

Belt-Conveyor Panel Costs by Development Periods

—C. P. Brinton, mining engineer, Barnes & Tucker Co.

Multiple Units

—B. F. Reed, vice-president, Turner Elkhorn Mining Co.

## MODERN MINE DRAINAGE

Dewatering of Abandoned Mines

—A. B. Kelley, general manager, Humphreys Coal & Coke Co.

Automatic Control of Large Mine Pumps

—E. B. Wagner, electrical engineer, Lehigh Valley Coal Co.

## MINING EXTENSION COURSES

C. E. Lawall, director, School of Mines, West Virginia University.

H. E. Nold, professor of mining engineering, Ohio State University.

H. B. Northrup, director, Mineral Industries Extension, Pennsylvania State College.

## A NEW AND PRACTICAL METHOD OF WORKING A 20-IN. SEAM OF COAL

Guy E. Lipe, manager, Dixie Fuel Co.

▼  
**Thursday, May 20**  
**10 a. m.**

## NEW DEVELOPMENTS IN METHODS WITH MECHANICAL LOADERS

G. Stuart Jenkins, general superintendent, Consolidated Coal Co.

## DEFINITION OF TERMS: POWER FACTOR, LOAD FACTOR, LOAD DEMAND FOR AVERAGE MINE MANAGER—EFFECT ON POWER COSTS

M. W. Horgan, mining representative, Monongahela West Penn Public Service Co.

## National Exposition of Coal Mining Equipment May 17-21

AN exhibit of the latest in cost-reducing machinery for safe and efficient operation (a complete list of exhibitors appears on page 223)

▼ ▼ ▼

## SAFETY BONUSES

J. J. Sellers, vice-president, Virginia Iron, Coal & Coke Co.

Discussion: C. A. Sine, safety engineer, Stonega Coke & Coal Co.

## COAL CLEANING

Methods and Performances in Drying Washed Coal

—T. W. Guy, consulting engineer, Charleston, W. Va.

Use of Coal-Washing Tables for Preparing Coking Coal

—Henry J. Hager, preparation superintendent, Alabama By-Products Corporation.

Oil Treatment

—M. H. Forester, manager of preparation, Consolidation Coal Co.

Dedusting Methods

—Henry F. Hebley, coal preparation department, Commercial Testing & Engineering Co.

## FUN AND LAUGHTER

WARD WILSON, nationally known radio comedian and imitator, master of ceremonies

**Monday** CALIFORNIA VARSITY EIGHT . . . singing organization, formerly with Ziegfeld Follies.  
8 p.m. to 2 a.m.

BYTON PETITE REVIEW . . . lovely girls in ensemble and specialty dancing . . . recently completed vaudeville tour Eastern and Mid-Western theaters.

MINERS' NATIONAL AMATEUR HOUR . . . sponsored by coal companies . . . entries selected through local elimination contests . . . winners to be awarded prizes and an opportunity to appear on a radio program.

Dancing . . . to a nationally known orchestra.

**Tuesday** GAY NINETIES NIGHT . . . featuring the Floradora Girls . . . Joe E. Howard, old-time song writer . . . room and all featured entertainment to be centered around Gay Nineties theme.  
8 p.m. to 2 a.m.

SPECIALTY ACTS by California Varsity Eight and Byton Review.

**Wednesday** LUCKY SHOES CONTEST . . . an original and gay evening devoted to the selection of "Cinderella's Slipper" . . . entries sponsored by coal companies.  
8 p.m. to 2 a.m.

SPECIALTIES by Kelly-Bahlke Dancers.

**Thursday** ANNUAL "SPEECHLESS" DINNER  
6:30 p.m. to 2 a.m. MISS RUTH ETTING, guest artist.  
CALIFORNIA VARSITY EIGHT  
BYTON REVIEW, dancing.

2:30 p. m.

## THE FUTURE OF MECHANICAL MINING

Paul Weir, consulting mining engineer, Chicago.

## SECURING TEAMWORK BETWEEN MANAGEMENT AND LABOR

Carel Robinson, manager of mines, Kelleys Creek Colliery Co.

## AN APPROACH TO THE PROBLEM OF ANTHRACITE MERCHANDISING

Bruce Payne, president, Payne Coal Co.

## BITUMINOUS COAL RESEARCH PROGRESS

John C. Cosgrove, president Bituminous Coal Research, Inc.

Discussion: Howard N. Eavenson, president, Clover Splint Coal Co.

Ralph A. Sherman, fuel engineer, Battelle Memorial Institute.

A. W. Gauger, director, mineral industries research, Pennsylvania State College.

H. C. Howard, assistant to director, Coal Research Laboratory, Carnegie Institute of Technology.

M. M. Leighton, chief, Illinois Geological Survey Division.

J. E. Tobey, manager, fuel engineering division, Appalachian Coals, Inc.

# MOBILE ROTARY DUMP

## + Provides Versatile Handling

## When Dumping Slate

**"B**UT there is some better way of dumping this slate and we are going to try to find it," was the remark made to an editor of *Coal Age* over two years ago by the chief electrician and master mechanic of Gauley Mountain Coal Co., which operates mines at Jodie and Ansted, Fayette County, West Virginia. That better method, inaugurated in April, 1936, has demonstrated its advantages for the Gauley Mountain conditions. It consists of a new type of machine, known as the Dalton mobile rotary dump, which bodily picks up the mine car and its contents, and dumps the latter at any point in a full circle.

### Works on Hillsides

This dump, designed primarily for hillside disposal where the fill is to be built parallel to the track, therefore is well suited to making level fills for mine yards. When combined with the service of a shifting locomotive, end dumping can be effected to build longer fills for extending tracks.

Essentially the machine consists of a self-propelling chassis, turntable mounted body, car-hoisting mechanism and rotating cradle for turning the cars upside down. Its ideal application is dumping a long train of cars that have been spotted on a level dumping track. All cars are uncoupled; the dump is driven to the end of the trip, where it picks up one car at a time, dumps its contents "over the hill," swings the car on around to the other end of the machine and lowers it back onto the track. Each successive car is handled in the same way and finally the mobile dump ends up at the other end of the whole trip.

Only one man, the dump operator, who sits in a cab at the center of the

body, is required for this method of dumping. At the speeds to which the working parts of this first machine are geared, 200 cars could be dumped in seven hours if that many were available in one string (32 cars have been dumped in one hour). In the actual practice at Ansted, where loaded cars usually arrive in lots of less than 15 and there are "out-of-car" as well as switching delays, the dumping averages 60 cars in 7 hours. One-hundred cars could be dumped in 7 hours with present switching methods if the "out-of-car" delays were eliminated.

When the dump has completed the emptying of a whole trip, the cars then have been turned end for end. To head them back to the normal direction, they are switched around a Y track of the mine yard. Before the fill had been completed to make space for the Y track, the cars were re-turned to normal by running the dump back "through the trip"—i.e., picking each car up a second time and placing it back on the track at the other end of the dump.

### Two Men Dump Cars

While one man is operating the dump, another is using a locomotive to switch cars. The second man, while not otherwise engaged, assists at the dump by uncoupling and coupling cars and guiding the empty cars down so the dump operator needs be less exact and cautious in landing the car wheels back on the rails.

The cars, of all-steel construction, have a level capacity of 90 cu.ft., weigh 3,700 lb., are 7x13 ft. over all and stand 23 in. above the rail. The usual net load of refuse is 6 tons. To test the capacity of the machine, a car loaded to a gross weight of 13 tons was successfully dumped. As a safety precaution against the dump

tipping down over the bank, due to excessive load or to the fill giving away under the outside rail, a third rail and outrigger wheel are used on that side.

In building a fill for a mine yard, cars of coarse material are dumped on the steep side and those with fine material are dumped to the other side as a surfacing layer or track ballast. Gross weights of cars loaded with fines are less than those with coarse material, so can be dumped to the inside without any necessity for an outrigger wheel and rail on that side. Another advantage of the selectivity of dumping point for each car is that cars loaded with a large percentage of coal can be dumped to the inside and thus on top to make a better ballast and diminish the chance of spontaneous combustion.

### Dump Weight 25 Tons

Weight of the dump including the counterweights necessary to balance the heavy loads when swung at right angles to the track is 25 tons and the over-all dimensions of the machine are 10x32 ft. The dump was constructed in the coal company's shop and the design embodies several assemblies from mining machinery which had been taken out of service. The chassis is built from that of a mine locomotive but includes only one of the two original traction motors. Another 600-volt d.c. motor taken from a mining machine furnishes power for hoisting the car, turning it upside down and swinging. There is no stop to the arc of swing; in other words, no limit to the number of times that complete rotation can be repeated in either direction without "unwinding."

In hoisting, the cars are engaged by long chain-suspended steel beams which swing into a locked position under the sides. Hoisting continues until the car is pulled up tight against the cradle, thus securing it for the

tipping. Complete upside-down dumping has the distinct advantage of freeing the corners of all material that will drop by gravity.

The series of illustrations below, numbered in the order of the procedure, show a complete dumping cycle. W. T. Dalton, chief electrician and

master mechanic, developed and designed this dump. The coal company has patents covering the principal features.

## Six Steps in Dumping Refuse At Gauley Mountain



Fig. 1—Dump, moved to end car of a trip, swinging around to position while bars of cradle are lowered to engage car



Fig. 3—When car is hoisted to its limit, automatic stops transfer the power to the cradle shaft and tipping begins



Fig. 5—Now on edge, but rotation will be continued until car is upside down and all corners clear of loose material

Fig. 2—Going up, and at the same time the operator starts to swing car around to side preparatory to tipping



Fig. 4—In dumping, the refuse material in the car is distributed over a space 4 to 15 ft. from the outside rail



Fig. 6—Lowering the car back onto the track, but doing so at opposite side of the dump from where it was picked up



# NOTES

## From Across the Sea

SETTING FIRE to the mines to make gas for industrial and chemical uses is receiving exemplification in the mines of the U.S.S.R. Apparently it is to a Russian, D. I. Mendeléeff, the author of the celebrated periodic law relating to atoms, that the project for gasifying coal in its natural bed is due. He made his suggestion in 1888, some time before Sir William Ramsay, of argon, neon, krypton and xenon fame, advocated some such project. As was reported in *Coal Age*, June, 1934, p. 243, the Russians have been quite active in developing this idea. In 1931, the Soviet Government made a grant to subsidize such tests, and in 1933 established a special State bureau, the Podzemgas (underground gas) trust, to conduct scientific investigations and experiments into underground gasification.

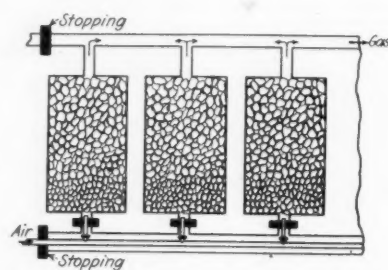
Such projects might be conducted by drilling holes down to the coal, declared P. A. Chekin, A. I. Semenov and J. S. Galinker, in addressing the section of chemical engineering at the World Power Conference, but this extremely simple method implied difficulties which reduced their value, and certain preparatory mining work was deemed advisable.

The authors of the first schemes tried to imitate as closely as possible the methods used on the surface in the gasification of coal. All gas producers operate on crushed fuel, and their success is largely dependent on the quality of this crushing. Large pieces of coal cause the air to form channels in the coal bed and have an adverse effect on gas composition.

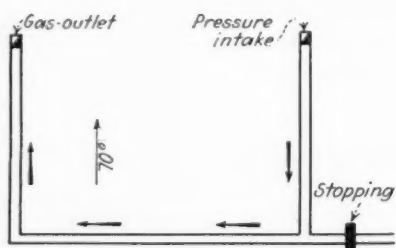
Kirichenko proposed drilling boreholes from the surface into the coal bed and loading them with dynamite so that, when the coal fire approached the explosive, the heat would ignite it and shatter the coal. But these explosions occurred so irregularly and broke the coal so unsatisfactorily that the flow of gas was too irregular as to quality to supply the demands of industry for a gas of uniform quality. Canalization doubtless occurred, for the coal must have been shattered into pieces of greatly varying size. As a result, the gas contained at times too much carbon dioxide and oxygen and too little combustible. Regulation was impossible, and the tests were discontinued.

Kutnetzoff proposed that the coal be gasified by given a preliminary preparation by mining, and his method has been dubbed the "warehouse," or storage, method. It was installed in a bed of anthracite 17½ to 19½ in. thick—too thin to be worked. At first apparently a single room was driven and

enough coal left in mining to fill it completely with broken coal. Air entered under pressure from a pipe in the lower gangway, and generator gas was removed by a similar passage. Heavy stoppings, apparently set well into the coal, were constructed at the room neck, and beyond the room in which gas was generated others were built across both gangways. But with this provision the composition of the gas was not constant. Carbon-dioxide content varied from 12 to 18 per cent; carbon monoxide, from 10 to 19 per cent; hydrogen, from 6 to 12 per cent; methane, from 1 to 2 per cent, and the heat content from 38.2 to 56.1 B.t.u. per cubic foot. Kutnetzoff sug-



Coal storage method of Kutnetzoff. Coal is gasified in rooms



Mine for gasifying coal by stream method

gested a series of parallel rooms so that the gas analysis would be averaged. However, as the ribs eventually take part in the gasification process, all the coal entering into the reaction has not broken to the required size. Moreover, anthracite, say the authors, is not so suitable as bituminous coal for this purpose.

Two new methods of operation have been adopted. One, known as the "stream" method, developed at the Donetz Coal Chemical Institute by Skafa, Matveyeff and Philipoff, gasifies the coal without preliminary breaking. A portion of the Gorlovka mine in the Donetz Basin containing 11,000 to 12,000 tons of gas coal pitch-

ing about 70 deg. was devoted to the experiment. The coal contained up to 17 per cent of volatile matter.

From the foot of a temporary shaft a tunnel, driven in the rock, was connected with a level gangway in the coal. Another tunnel in the rock led from the end of this gangway to the foot of another temporary shaft. The level gangway originally was connected with the main mine, but, before igniting the coal, was isolated from it by the construction of a specially designed stopping. The shafts were lined with steel so as to prevent the rock from caving under the heat of gasification. The tunnels were lined only with wood and these supports probably have been burned. Air under pressure enters by one shaft and leaves by the other, and the entire gangway was set on fire by the use of firewood, tar and other combustibles supplemented with a little oil, causing the coal and roof to fall.

It is supposed that the rock in falling does not completely shut off the roadway but leaves a passageway for entering air and escaping gas. The entering current is either natural atmospheric air with 23 per cent of oxygen or is enriched to contain 30 per cent of that gas; the first gas obtained had 10 to 12 per cent of carbon dioxide, 23 to 27 per cent of carbon monoxide, 12 to 15 per cent of hydrogen, 2 to 3 per cent of methane and 43 to 47 per cent of nitrogen. The heating value of the gas varied from 51.0 to 66.2 B.t.u. per cubic ft. By changing the pressure and the percentage of oxygen the gas composition could be regulated.

On an attempt being made to alter the direction of the air current, the mixture exploded and destroyed some of the roof supports and stopped the process. During this interruption and while repairs were being made, air at intervals was supplied so as to keep the fire alive, and it was observed that, after the current was stopped, the gas which continued to emerge from the shaft contained as much as 60 to 70 per cent hydrogen.

Similar results were experienced with other test panels when the current was reversed and gas was drawn off by means of an exhaust. It was thought that, when the pressure dropped as a result of reversal, the moisture of surrounding rock and coal entered into the fire zone and, reacting as in a water-gas generator, caused a gas to form containing a high percentage of hydrogen. But when there was no current the gas also carried up to 15 per cent nitrogen, far more than could come from the coal and which could not come from entering air, for that was shut off.

It was surmised that during normal operation, gas enters the rock, and after the pressure drops, the hydrogen, being the lightest and most responsive gas, enters the gangway before the other constituents and is first to leave the mine. The rock, in short, acts as a filter. The rich gas is suitable for use in the manufacture of ammonia,

benzene, gasoline and other chemical products.

Since August, 1935, the Gorlovka test area has been operated with air admitted at timed intervals. The gas received while air pressure is being applied has been termed "power gas" and is suitable chiefly for combustion and heat supply. The mine yields 883,000 to 1,059,600 cu.ft. of power gas every 24 hours and 423,840 to 529,800 cu.ft. of gas for chemical use. The length of each period, with and without air pressure, varies from four to six hours. Investigation is being made to find the most desirable length of time for each period of operation, as well as the quantity of oxygen best suited for use.

With 38 per cent of oxygen, gas for chemical purposes is obtained containing 18 per cent of carbon dioxide, 15 per cent of carbon monoxide, 49 per cent of hydrogen, 4 per cent of methane and 14 per cent of nitrogen, though such a gas can be obtained from a producer above ground only when the air supplied contains 60 per cent of oxygen and when a subsequent catalytic action enables carbon monoxide to react with steam. Thus, the mine automatically produces coal, gasifies it, raises steam for regeneration and regenerates the gas when the steam is raised.

Power gas from the Gorlovka mine contains 18 per cent of carbon dioxide, 15 per cent of carbon monoxide, 2 per cent of hydrogen, 3 per cent of methane and 44 per cent of nitrogen and has a heat content of 62.4 B.t.u. per cubic foot. This heat capacity readily can be increased by raising the percentage of oxygen in the air forced into the mine, for with a high oxygen content the temperature rises enough to reduce carbon monoxide and water.

Grindler, who used the same stream process without oxygen, recovered gas of 204 B.t.u. per cubic foot, which would have been quite tempting, but he was making inadequate use of the carbon in the coal, as he merely converted it to coke. Hence he has changed his method and now gets a gas with heat value of from 40.8 to 51.0 B.t.u. per cubic foot.

Coal has been gasified underground for many months in the Kuznetzk basin where the coal is level. The failure of the roof in this case obstructs the gas stream more than in pitching beds and affects the regularity of operation. Some of the carbon dioxide generated remains in that form because it does not reach the glowing embers which would convert it to a monoxide.

To meet this, Semenoff and Galinker are using the Gorlovka method, but blowing in air and steam as in the regenerative method of producing gas in a water-gas producer. Because of the length of the tunnels, the periods with steam and with air have been made of 20 to 30 minutes instead of 2 to 5 minutes, as is usual with a water-gas producer.

Five or six industrial coal-gasification operations will be initiated, some

operating on the Golovka method and some on the regenerative method. The engineers, viewing what has been done by Fischer and others, are quite hopeful of making this gasification project the basis of a chemical industry and of the manufacture of sponge iron,

not because the gas is superior to what may be produced above ground but because the gases are produced at low cost.

*R. Dawson Hall*

## On the ENGINEER'S BOOK SHELF

*Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case is in the review notice.*

*Bituminous Coal Research. Coal Division, American Institute of Mining and Metallurgical Engineers, H. E. Nold, Division Secretary, Columbus, Ohio, 86 pp., 8½x10½ in., and 13 pp. of graphs, 15½x10½ in. Price, \$1.50.*

This mimeographed report of the Committee on Bituminous Research Planning of the institute is the outgrowth of work undertaken late in 1933 when the Coal Division was asked to prepare a comprehensive outline of bituminous-coal research. Search of the published literature revealed that no such all-inclusive outline had been set up or started either here or abroad. The committee, headed by Dean Steidle of Penn State, then requested members of the Department of Fuel Technology of the School of Mineral Industries, State College, to make a skeleton outline as a working basis. Next a selected group of coal men and research workers was asked to prepare detailed outlines of research activities in their respective fields; 78 of the 85 invited to participate contributed to the plan. Publication of the report itself was financed by a number of organizations and individuals.

The outline covers six major divisions: geology; mining; constitution, structure and properties of bituminous coal; distribution problems; processing; and uses. The geology section is broken down into the origin and natural history of coal, and geographical and geological maps. Mining methods, ground movement and subsidence, acid mine drainage and stream pollution, human relations, health and safety, taxation, and mineral lands and regulations are the major subdivisions of the mining section. The third major outline is subdivided into constitution and structure; classification; preparation; and sampling, analysis and testing. Distribution phases outlined are marketing, transportation, storage, economic studies, and conservation.

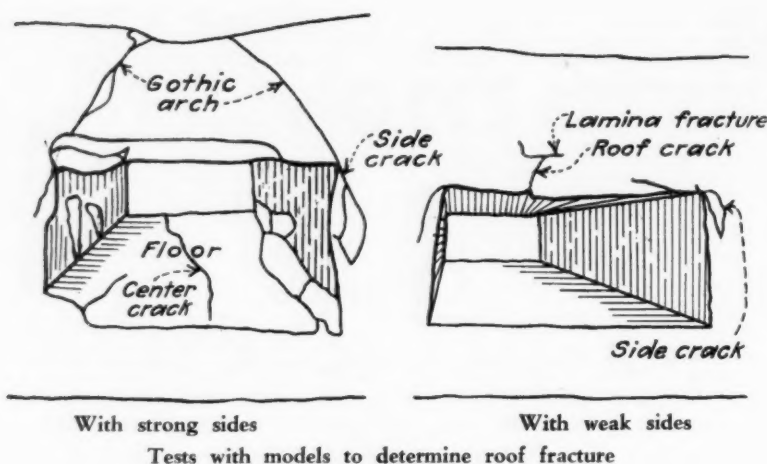
As pointed out in the foreword, the committee made no attempt to plan a

definite program on any phase of research. "On the other hand, it seemed desirable to bring together under one cover for ready reference the major divisions of study and the essential items under each division" in the hope that such correlation and publication would be a stimulus to research activities. The mass of data set down without textual expansion or exposition in this volume is revelatory as to the extent of the ground to be covered in a fundamental study of bituminous coal in all its ramifications. Inquiring minds also should find the outlines highly suggestive of the possibilities in such study.

*Fourteenth Annual Report of the Safety in Mines Research Board. Mines Department. British Library of Information, New York. 144 pp.; paper. Price, 65c.*

This report for 1935 describes additions to the exhibition hall, the new model mine roadway and coal face at the Buxton Research Station, the international mine safety conference held at Dortmund, Germany, in September, 1935; the Research Board's safety instruction, and its safety and health research. It concludes with appendixes which occupy half the book.

Readers will note that every size of coal dust requires for flammation a different minimum quantity of dust per square foot of airway; each size also needs a different quantity of inert dust to render it harmless at the most favorable coal-dust concentration for ignition and, like a gas, each has a definite surfeiting concentration at which so much coal dust is present that it refuses to burn even when free of inert dust. This last condition, arousing the most cheerful anticipations, however, is promptly doused by Sir Edward Troup, chairman of the safety board, with the statement that, when an explosion fills an atmosphere with so much dust that no flame can penetrate and propagate in it, violence de-



creases, reducing the turbulence, permitting the coal dust to fall and the flame advances again as soon as the atmosphere has such a concentration of dust that its ignition again becomes possible. In this way, a dust surfeit does not act exactly like a surfeit of gas, for gas excess cannot be deposited and therefore prevents explosion until it receives more air.

In his perusal the reader will be interested to learn that sodium bicarbonate, used probably merely for the light it throws on the action of other substances, emits its carbon dioxide so easily that it probably is more extinctive of the flame of an explosion than the carbonate; also that, whereas a hard rock, like quartzitic sandstone, when cut, will develop a hot spot and thus ignite methane, pyrite must not only be heated by the friction but also must be oxidized by air before it will burst into flame and fire methane. The report declares that finely ground pyrite warmed to about 464 deg. F. may be ignited by a gentle stream of air. However, one may still wonder whether the tests made to establish this conclusion duplicated exactly the conditions under which pyrite balls and coal are cut in the mines.

In Germany, three fires have originated at rubber conveyor belts, one due to the heating of the gears of the driving motor, one to the friction of rollers that refused to turn, and one to an unknown cause. Experiments proved that friction between belt and rough wood, tools or stationary rollers will not fire a belt unless coal dust on it is first ignited by the heat; hence coal-dust accumulations always should be removed after a belt stops; this from Herr Schulze-Rhonhof at the international mine safety conference.

At the Steetley colliery of the Shire-oaks Colliery Co., says the report, installation of stationary lighting with 110-volt incandescent lamps decreased accidents on a two-way conveyor long-wall face materially; 100 men were employed and the lighting of at least part of the face had been installed twenty months. With each increase of the face thus lighted, accidents decreased. Sixty-watt lamps were set 27 ft. apart, and the report raises the question whether less powerful lights

at correspondingly shorter intervals would be even more effective in accident prevention.

The report discusses the action of undermined strata using a rubber bag under an internal pressure of 100 lb. per square inch to impose a load on mortar material representing measures mined by a single straight opening. It shows that a crack developed along the center line of the floor of the opening. This British report shows also a Gothic arch fracture in the roof spanning the opening and regards that type of breakage as typical for an opening with strong sides. Fractures appear at tops and bottoms of the "ribs" of the opening. This reviewer reported to the American Institute of Mining Engineers, September, 1915, from tests—using soap instead of mortar for roof, side and floor of the opening—that a tensional stress appeared in the floor, causing breaks in it at the sides of the opening (Trans., Vol. LIV, 1916).

With weak sides, the floor remained intact, as might be expected, but cracks developed in the haunches of the opening near the roof, which also developed an oblique break, not in the center but to one side of it. This, at some distance above the opening, spread in both horizontal directions along a bedding plane, showing apparently that the stresses developed a laminar separation in what seemed a truly integral structure. More details of the experiment are desirable to explain the action, especially as to the area of pressure incidence and as to the way in which the mortar was placed. Too many subjects are interestingly treated for complete comment in this brief review.—R. DAWSON HALL.

*Procedure Handbook of Arc Welding Design and Practice.* Lincoln Electric Co., Cleveland, Ohio. 819 pp., 5 1/2 x 9 in. Price, \$1.50 in the United States, \$2 elsewhere.

This revised and enlarged fourth edition has been brought down to date and includes 223 pages of new data covering the characteristics of the welding generator, selection of type of joint, insurance of fusion-welded vessels, welding codes, arc cutting, sheet-metal

welding and the effect of electrode size on welding costs. Part VIII, "Typical Applications of Arc Welding to Manufacturing, Construction and Maintenance," should be particularly interesting to coal men because of the information it gives on cutting tool and die tipping for superior performance in machine-shop practice and the illustrations of welded, built-up and hard-surfaced mine-equipment parts shown. The book includes 990 illustrations, of which 289 are new to the present edition.

*Geology and Fuel Resources of the Southern Part of the San Juan Basin, New Mexico; Part 2—The Mount Taylor Coal Field,* by Charles B. Hunt, U. S. Geological Survey. Bulletin 860-B; 80 pp., with map pocket; paper. Price, \$1.

Mount Taylor lies almost on a line between Gallup and Albuquerque, N. M.; a little nearer the latter. The many coal beds of the field named after it are of Mesaverde formation, of sub-bituminous rank and usually about 15 in. thick, though there are many thicker seams and some as much as 6 ft. thick. Along the Atchison, Topeka & Santa Fe Ry., lying to the south of the area, are many small coal mines.

*Mineral Deposits of the Ruby-Kuskokwim Region, Alaska,* by J. B. Mertie, Jr., U. S. Geological Survey. Bulletin 864-C; 255 pp.; paper. Price, 25c.

This field lies between the Rivers Yukon and Kuskokwim, west of the Matanuska coal region. As a coal region it is unimportant, its only hope being that it lies near gold-mining and possible quicksilver-, antimony- and silver-mining activity. Some of the coal is semi-anthracite and some sub-bituminous. The seam thicknesses run from 14 in. to 40 in., and a few small shafts have been sunk, but not much work appears to have been done.

*Carbonizing Properties and Petrographic Composition of Clintwood Bed Coal From Buchanan Mines Nos. 1 and 2, Buchanan County, Virginia.* T. P. 570; 34 pp. Price, 10c.

*Carbonizing Properties and Petrographic Composition of Pittsburgh Bed Coal From Pittsburgh Terminal No. 9 Mine, Washington County, Pennsylvania.* T. P. 571; 33 pp. Price, 10c.

These two monographs are U. S. Bureau of Mines publications and alike are the product of A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, G. C. Sprunk and F. W. Jung. They describe tests made with the respective coals in cooperation with the American Gas Association, which duplicate the methods of testing described in previous monographs of the same series.

# OPERATING IDEAS

## *From Production, Electrical and Mechanical Men*

### New Roof Treatment Proves Out At Southwestern Mines

By V. C. ROBBINS  
Mining Engineer, McAlester Fuel Co.  
McAlester, Okla.

A NEW TREATMENT for mine roofs that appears to be perfectly satisfactory in preventing disintegration from humid air currents apparently has been found as a result of long-continued experiments with various materials in the coal fields of the Southwest. This new treatment was given its first trial in the Spadra field, Johnson County, Arkansas, where the Hartshorne vein is mined. The overlying roof section—the Spadra shale—consists of a fine-grained blue, black or gray shale, sometimes containing sandy beds and, in some places, thin sandstone lenses. It is characterized by thin laminated shales, particularly in that section immediately overlying the Hartshorne coal vein. The shale apparently contains a limited quantity of lime or calcareous material, which renders it particularly susceptible to disintegration where it is exposed to or comes in contact with air currents of high humidity.

In the spring or early summer seasons, the advent of the first hot weather brings on the annual "sweat" in the mines of Arkansas and the other Southwestern States. As the warm air currents are cooled immediately after they arrive underground, the condensed water vapor collects on the roof and entry side walls. Almost immediately a chemical action takes place, and the rock begins to chip or fall off. This disintegration of the roof and side walls is altogether independent of pressure or load. It has for many years been a source of hazard, inconvenience and great expense to the mine operators of Oklahoma and Arkansas, and has been particularly bad in the Spadra field.

Timbering is in no way a preventive of this trouble. Some operators have successfully defended their mine roof

with "Gunite", but the application of this material is quite expensive and very often entirely beyond the means of small operators. For years an economical material has been sought that would effectually seal the roof against atmospheric action. Now, a material manufactured by the Sherwin-Williams Co., called "Ebonol", seems to give promise of successful protection against this aggravating condition. It was first applied in a test section at the Fernwood mine of the McAlester Fuel Co., in the Spadra field.

The location of the test was in the intake airway about 300 ft. from the shaft bottom, in a newly driven entry where the original roof section was intact and had not yet been affected by the annual "sweat". The application was made May 18 and 19, 1935, while the roof was yet dry. About 40 ft. of entry was used for the experiment. Both roof and side walls were cleaned free of all loose rock. Two spray coats of Ebonol were applied in accordance with the manufacturer's instructions.

By midsummer, with all other parts of this and adjacent mines having their annual trouble with falling rock, this test section gave no sign of being affected in any way by the condensed water vapor with which it was constantly covered. With the approach of winter, the mine roof became dry again, and still there was no sign of disintegration. The same status prevailed during the "sweating season" of 1936 and up to the present date the original test section is standing without showing any effects of atmospheric action, while the untreated roof—both inby and outby of the test section—shows unmistakably the usual spalling of the regular "sweat" periods.

As a result of the apparent success

of Ebonol in the Spadra field, the Sukenis Coal Co., Adamson, Okla., operating a slope mine in the McAlester vein, decided to make a more extensive application. In this mine the main slope (intake airway) was treated for a length of 800 ft. from the portal, as were four 14-ft. partings, each about 100 ft. in length. The application was made over a period of several days and was completed May 15, 1936. Inasmuch as this mine is seven or eight years old and the roof had previously required timbering in quite a number of places, it was impossible to scale the roof perfectly clean at all points, but the scaling was done with a good deal of care and no broken rock was left except where necessary. These openings were given a good one-coat application of Ebonol. To this date the results at the Sukenis mine seem perfectly satisfactory, there being no signs of spalling where the roof or sides had been well cleaned before application.

In the Sukenis mine 10,000 sq.ft. of slope and 7,200 sq.ft. of partings—a total of 17,200 sq.ft. was given the Ebonol coating. The detailed cost was as follows:

LABOR	
2 men, 2½ days each, chipping loose rock @ \$4.50.....	\$22.50
2 men, 3 days each, spraying Ebonol @ \$4.50.....	27.00
MATERIAL	
3.80 bbl. (190 gal.) Ebonol @ \$50 .....	190.00
TOTAL .....	\$239.50
Cost of treatment per square foot .....	1.4¢

It so happened that this mine slope was equipped with a compressed-air line so that air for the spray gun was convenient and accessible. In the Arkansas test section, however, the spray application was made with a spray gun and pump borrowed from a near-by fruit ranch. The use of this material is so simple, economical and apparently effective that it might well be put into general use to the great benefit of many mines that have for years been suffering for want of an effective seal against the disintegrating action of humid air currents.

## This Way

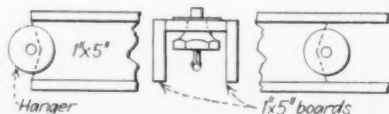
● A little knowledge put back in one corner of the brain beats any amount of head scratching when an unexpected problem comes up. One way of gaining knowledge is by personal experience, but personal experience doesn't cover everything, while the Operating Ideas section does. Sooner or later, a problem may be expected to come up for which a solution is offered in these pages. Similarly, other operating, electrical, mechanical and safety men may be able to benefit from your experience. Coal Age will welcome the opportunity to publish the details, and will pay \$5 or more each for acceptable ideas. A sketch or photograph may help to make them clearer.

★ ★

### Easy Installation Features Trolley Guard

Strength, neatness and ease of installation are the major features cited for the trolley guard illustrated below, which was submitted by Walter Iman, Kitzmiller, Md. As indicated, the guard consists of a 1x5-in. oak board notched to fit around the trolley hanger, to which similar 1x5-in. boards are nailed to form the sides. Hangers, Mr. Iman points out, should be spaced approximately 10 ft. apart over turn-outs when the straight wire is to be guarded. On curves, the spacing at times should be considerably less, depending upon the radius of the curve. Such spacing, however, is optional, and depends upon local conditions.

Tools necessary to install this type of guard board consist of a trolley-clamp wrench, hand saw, hatchet and



Details of guard board installation

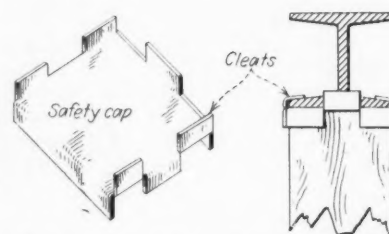
a few 10D nails. If hangers are spaced to suit, the clamp at the end where the guarding is to start is loosened just a little and then is tapped away from the space where the guard board is to be placed by light blows with the hatchet. Next, the second hanger is similarly driven out in the opposite direction, increasing the distance between the two hangers. Then a board of the proper length to span the normal distance between the hangers is cut and notched as indicated in the illustration. The board then is placed in posi-

tion, the first clamp is tightened on the wire and the second clamp is driven toward the first so that the board is held firmly in place. The two drop boards then are nailed in place to make the guard. Clamps must be tight in an installation of this kind.

Width and length of the boards, Mr. Iman points out, can be changed to suit the job in question. Where there is plenty of height, the top board can be drilled and placed above the hanger, with the expansion bolt going through the drillhole.

### Crossbars Held in Place By Safety Cap

To make sure that crossbars do not twist out under pressure or are not pulled off the tops of legs when a trolley pole jumps the wire, or that legs are not knocked out when trips are derailed or thrust out by side pressure, Anthony Shacikoski, Salina, Pa., suggests the use of the safety post cap shown in the accompanying illustration. This cap is made of plate about  $\frac{1}{2}$  in. in thickness in sizes to fit posts or piers in use. In installing timbers, the cap is placed on the top of the post or pier constituting the leg and the end of the crossbar is laid on it. Then, the cleats on the sides of the cap are clinched on the I- or H-beam or rail in case crossbars of that type are employed, as shown in the illustration. This prevents the leg and bar from twisting. Other cleats, as indicated, keep the leg from being thrust out of position by side pressure. The cap also serves the additional purpose of spreading the weight over the entire top of the leg,



Safety cap and method of applying it when H-beams are used as crossbars

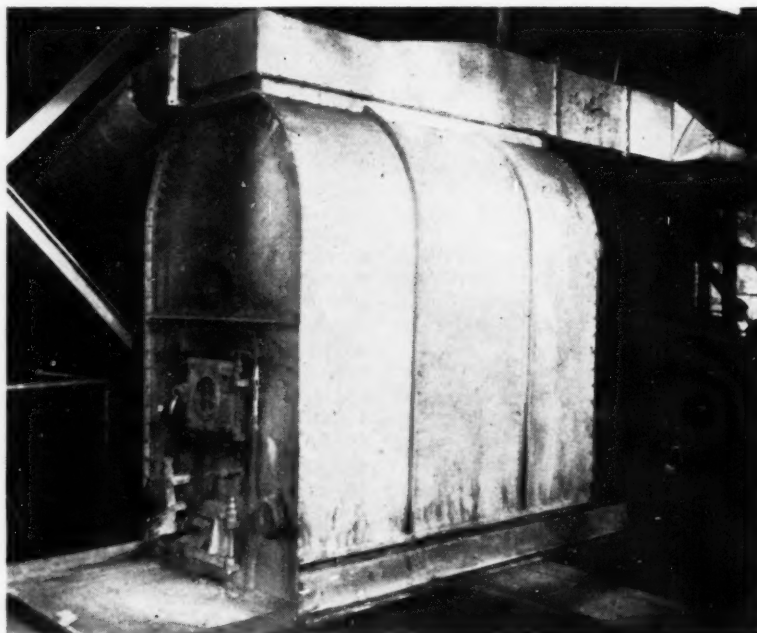
thus preventing in many cases cracking or splitting of a wooden leg resulting from the bar being driven into it when the weight comes on.

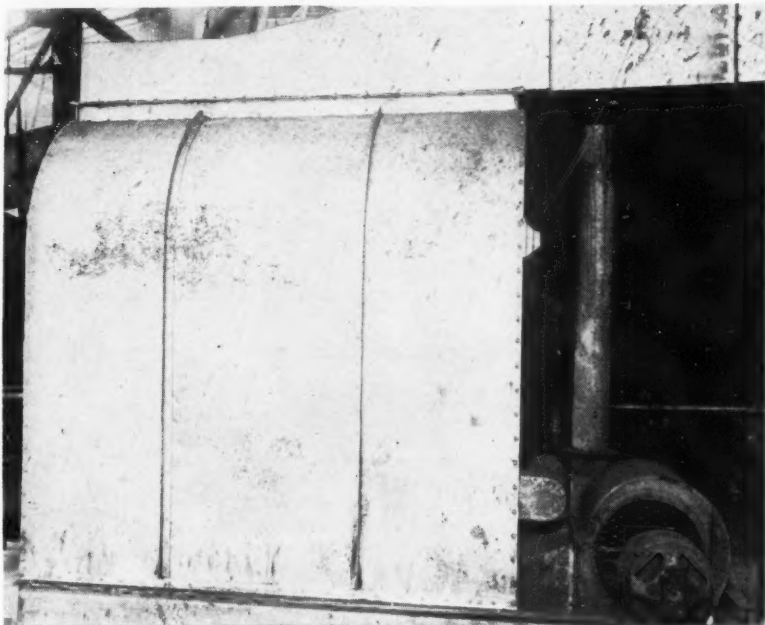
### Warm-Air Furnace Improves Heating in Washing Plant

More satisfactory heating has been secured in the No. 1 tippie and wet-washing plant of the Amherst Coal Co., Logan County, West Virginia, by installing a warm-air system to replace a steam system formerly used. Principal among the advantages is the concentration that can be secured at certain points during severe or unusual weather.

The heater, a Lee type of the Dravo-Doyle Co., is a direct-fired unit complete with motor-driven blower connected to the cold-air intake. The blower is rated 10,000 cu.ft. per minute and the heater 750,000 B.t.u. per hour. The following are data from an operating test on the unit when the outside temperature was 16 deg. F.: intake air, 20 deg. F.; average duct discharge

Front view of the heater as installed in Amherst No. 1 Plant





Side view showing the blower at the intake

temperatures, 80 deg. F.; cubic feet per minute, 9,561; heat output per hour, 568,000 B.t.u. In severe weather the heater consumes 1 ton of coal in 24 hours; that is, when forced draft is used for 10 hours.

Because the unit is installed in the plant building and near its center the heat from radiation is not lost. Floor space required is 4½ ft. x 7 ft. 2 in. To concentrate the total heat to one section of the building it is necessary only to close the regulating valves in the other ducts.

### Gravity Controlled End Play Improves Locomotive

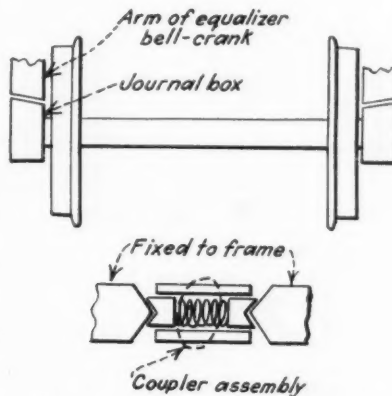
Inclined top contact surfaces on journal boxes to impart free coasting around curves and friction-type bumpers with spring-engaged V-blocks are the latest additions to the many improvements being made to locomotives when they are rebuilt in the shop of the Gauley Mountain Coal Co., Ansted, W. Va. One gathering locomotive with these features has been in use several months and its operating characteristics show an improvement over those of the locomotives previously rebuilt.

As indicated in the upper part of the illustration, gravity tends to hold the locomotive truck centered in the chassis. A large end-thrust force such as occurs when traversing a curve at speed causes the locomotive chassis to climb the journal boxes, thus providing a flexibility which results in a machine that from its first day in service coasts freely around curves.

Locomotives rebuilt without this feature did not give entire satisfaction

until after they became worn enough to have a certain amount of end play. The bell-crank indicated on the drawing is part of a longitudinal equalizer arrangement which has been incorporated in all of the Gauley Mountain rebuilds of the last several years (*Coal Age*, April, 1935, p. 165).

A schematic drawing of the friction bumper appears at the bottom of the illustration. W. T. Dalton, master mechanic, who designed both of the locomotive improvements, prefers to



Chassis and bumper improvements

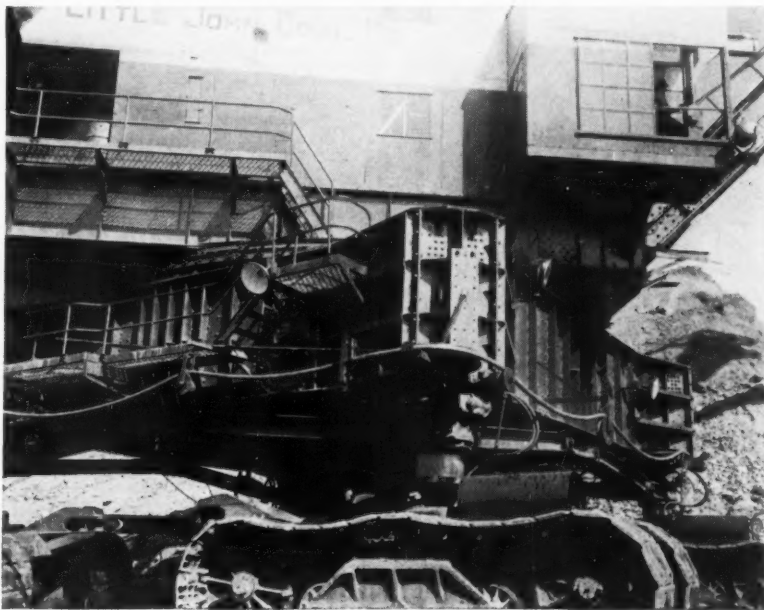
term the latter a "bumper cushion." Severe bumps and jerks are cushioned by climbing of the V-blocks and the normal friction of the surfaces prevents a rebound. Compression of the spring is sufficient to hold the blocks to the bottom of the V's at normal loads.

This bumper-cushion originally was designed for use on mine cars, the object being to reduce bumper length, thus taking up little or no space inside of the car body.

### Shovel-Cable Suspension Facilitates Handling

Through a system of pulleys and rollers, the trailing cable on the stripping shovel at the Little John Coal Co. operation, Victoria, Ill. (see p. 192

Showing method of carrying trailing cable around the frame on the Little John stripping shovel. When the unit reverses its direction, only the roller at the extreme right is employed



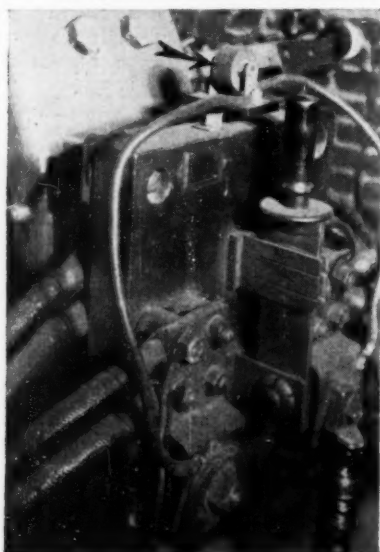
of this issue), is suspended on the frame as shown in the accompanying illustration. Through this system it seldom is necessary for a man to touch the cable during move-up periods, thus saving time and reducing the possibility of injury due to contact with the conductors. When the shovel is going one way, as shown in the illustration, the cable is carried around the frame to the rear corner by means of pulleys and rollers. When the shovel is going in the opposite direction, the cable comes out over the roller at the extreme right in the photograph. In either case, the cable is pulled along without the necessity for attention when the machine is moving up.

### Electric Valve Has Reduced Converter Maintenance

To protect manually controlled synchronous converters against insulation breakdown and to guard against flashovers induced by heavy short circuits, the Koppers Coal Co. has equipped the substations of its Powellton (W. Va.) division mines with Type CR9196 Thyrite units. These are connected directly across the armature terminals and are without switches in the circuits.

The half-tone shows a unit mounted on the top edge of the equalizer switch panel which on this type converter is attached to the field frame. Ratings of the converter are 200 kw. 275 volts and the Thyrite unit—General Electric Co. catalogue No. 4928847—is rated at "250 volts maximum". The trade name of the unit was formed from the Greek word "thyra", meaning door. At normal voltage the material has a high resistance, but upon increase of voltage beyond a critical point the resistance characteristic drops rapidly, hence "the door opens" and allows a high current to pass.

Arrow points to the Thyrite unit



Lumps traveling down the rescreen at Amherst No. 1 mine meet resistance in proportion to their size

### Drop-Axle Mounting Better Action of Retarders

To ease the lumps down over a sloping rescreen situated between the picking table and loading boom, worn automobile tires are put to good service at the No. 1 plant of the Amherst Coal Co., in Logan County, West Virginia. This use of tires is not new, but the method of mounting devised by T. C. Beury, preparation engineer, is a variation from the more common method of cutting sections from tires and nailing them to a wooden crossbar.

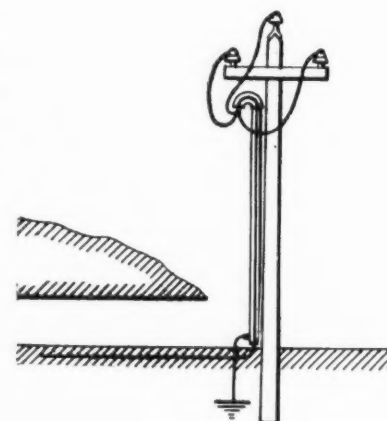
The rod on which the tires are hung side by side to fill practically the full width is made in the fashion of a drop axle. The end bearings are pivots; therefore the rod is free to swing when the tires are hit by extra large lumps which require more than the usual clearance.

### Added Protection Required For Non-Metallic Cable

Airplanes and coal have little in common, but possibly the coal industry can improve the lightning protection of its electrical equipment by taking note of experience with underground cables at airports. According to reports by the engineers of a certain cable manufacturer, it has been observed at airports that underground non-metallic sheathed cables terminated at pole line are less liable to lightning damage if carried in a grounded metallic conduit from trench terminal to pole top. This, of course, is recognized as a controversial subject and, like other lightning questions, is difficult to evaluate.

At numerous mines, pole lines feed 2,300 or 4,000 volts to cables which enter the workings by borehole, shaft, slope or drift. Use of steel-armored cable provided a grounded protection from the point where the cable left the ground to the pole-top connection, but with the wide adoption of non-metallic sheathed cables the more common practice is to dispense with conduit from ground to pole top.

This report of some evidence that metallic protection reduces the chance of lightning damage and the recognized



Grounded conduit as lightning protection for non-metallic cable

fact that in some instances a heavy metallic protection is in a degree a safeguard against sabotage indicates that for these non-metallic sheathed cables it is possible that money would be well invested in providing a metallic conduit from the point where they leave the ground to the pole top.

# WORD FROM THE FIELD

## Proposed Freight Rate Rise Attacked by Coal Men

Testimony by coal interests on the Class 1 railroads' proposal to make general increases in rates on commodities and classes of freight (Ex Parte 115) was completed before the Interstate Commission at Washington on March 31. The proposed rate advances, which would raise the charges on coal 3c. to 15c. per ton, were vigorously opposed by coal witnesses.

In introducing a lengthy exhibit covering various phases of the coal situation as affected by railroad freight charges, John D. Battle, executive secretary of the National Coal Association, asserted that bituminous coal and coke are in no position to assume any additional burden in rail rates. Markets are being lost by coal to competing fuels through no fault of the operators and, further, he said, in comparison with freight charges on other commodities, the rates on coal, taken as a whole, are already too high. He emphasized that, on the average, the freight rate on coal is greater than the mine price.

Henry J. Saunders, National Coal Association valuation engineer, compared the financial condition of coal roads with that of other carriers, showing that advances in rates would benefit those in sound condition and least in need of assistance. Therefore, he said, since rate advances have been requested as an aid to the weaker lines, any increase in coal rates would fail of its purpose. According to Charles E. Bell, traffic analyst for the National Bituminous Coal Commission, soft-coal operators have been paying a disproportionate share of railroad transportation revenues.

Opposition also was expressed by Ellery B. Gordon, representing the National Bituminous Coal Commission and Consumers' Counsel; A. S. Boden, traffic manager, Western Pennsylvania Coal Traffic Bureau; D. F. Hurd, Eastern Ohio Coal Operators' Association; C. J. Goodyear, traffic manager, Philadelphia & Reading Coal & Iron Co.; and representatives of byproduct coke manufacturers and retail dealers.

Speaking for the anthracite industry, Louis C. Madeira, 3d, executive director, Anthracite Institute, said "relief for the industry can come only through reductions of selling prices and freight rates in a sustained effort to arrest losses of markets and to regain some of the lost tonnage. Increasing the rates on anthracite is the very antithesis of the action which the carriers should take to conserve their revenues." Not only had 42 per cent of hard coal's former markets been lost, said Mr. Madeira,



"but we have failed to benefit through an increase of over 24 per cent in population in the last 19 years."

To speed decision on the revision sought by the carriers, the Interstate Commerce Commission decided on April 9 to consider rate increases on heavy commodities as a separate case. This decision will permit more expeditious consideration of testimony and arguments on such commodities as coal, coke, ore and oil. The Commission's action was taken at the request of the carriers.

## Anthrafil for Oklahoma

A new filtering agent, known as "anthrafil," consisting of pure granulated Pennsylvania anthracite, will soon be used exclusively to filter the water supply of Oklahoma City, Okla. An order for 412 tons was placed the first week in April with the Anthracite Equipment Corporation, an affiliate of the Anthracite Institute, to replace several hundred tons of sand formerly used in Oklahoma City filtering plants.

Other cities using granulated anthracite for purification of the public water supply include St. Paul, Minn.; Indianapolis, Ind.; Kankakee, Ill.; Bethlehem, Pa.; Duquesne, Pa., and Monterey, Mexico, in addition to the Passaic Valley Water Commission and numerous large industrial plants.



## STOKER SALES SHOW UPTREND

Sales of mechanical stokers in February last totaled 3,286 units, according to statistics furnished the U. S. Bureau of the Census by 108 manufacturers (Class 1, 63; Class 2, 33; Class 3, 31; Class 4, 31; Class 5, 13). This compares with sales of 3,102 units in the preceding month; 2,808 in February, 1936, and 1,373 in February, 1935. Sales by classes in February last were: Class 1 (under 61 lb. of coal per hour), 2,694 (bituminous, 2,378; anthracite, 316); Class 2 (61 to 100 lb. per hour), 199; Class 3 (101 to 300 lb. per hour), 228; Class 4 (301 to 1,200 lb. per hour), 119; Class 5 (over 1,200 lb. per hour), 46.

## Cincinnati Equipment Show Sets New Record

Even last year's high mark for interest and display of equipment seems due to be surpassed by the exposition features of the Fourteenth Annual Coal Convention and Exposition to be held under the auspices of the Coal Division of the American Mining Congress at Music Hall, Cincinnati, Ohio, May 17-21. Demands for space have been unprecedented. The list of exhibitors as of April 17 included:

Abbe Engineering Co.  
Advertising Displays, Inc.  
Ahlberg Bearing Co.  
Air Reduction Sales Co.  
Louis Allis Co.  
Allis-Chalmers Manufacturing Co.  
American Brattice Cloth Corporation  
American Bridge Co.  
American Car & Foundry Co.  
American Steel & Wire Co.  
American Wire & Cable Co.  
Atlas Powder Co.  
Austin Western Road Machinery Co.  
Bethlehem Steel Co.  
Bowditch Co.  
Broderick & Bascom Rope Co.  
Brown-Fayro Co.  
Bucyrus-Erie Co.  
Calcium Chloride Association  
C. S. Card Iron Works Co.  
Carnegie-Illinois Steel Corporation  
Chicago Pneumatic Tool Co.  
Cincinnati Mine Machinery Co.  
Coal Mine Equipment Sales Co.  
Coal Mining  
Coal Process Co.  
Coffing Holst Co.  
Columbia Steel Co.  
Crescent Lubricating Co.  
Cyclone Fence Co.  
Delster Concentrator Co.  
Differential Steel Car Co.  
Dorr Co.  
Duff-Norton Manufacturing Co.  
Duncan Foundry & Machine Works  
E. I. duPont de Nemours & Co.  
Edison Storage Battery Co.  
Electric Railway Equipment Co.  
Electric Railway Improvement Co.  
Electric Storage Battery Co.  
Enterprise Wheel & Car Corporation  
Fafnir Bearing Co.  
Fairbanks, Morse & Co.  
Flood City Brass & Electric Co.  
General Electric Co.  
General Explosives Division of American Cyanamid & Chemical Corporation  
Goodman Manufacturing Co.  
Gould Storage Battery Corporation  
Grasselli Chemicals Co.  
Gulf Oil Corporation  
Hazard Wire Rope Division of American Chain & Cable Co.  
Hendrick Manufacturing Co.  
Hercules Powder Co.  
Irwin Foundry & Mine Car Co.  
I-T-E Circuit Breaker Co.  
Jeffrey Manufacturing Co.  
Johns-Manville Co.  
Joy Manufacturing Co.  
Joyce-Cridland Co.  
Keystone Lubricating Co.  
Koppers Co.  
La-Del Conveyor & Manufacturing Co.  
Lehigh Safety Shoe Co.  
A. Leschen & Sons Rope Co.  
Link-Belt Co.  
McGraw-Hill Publishing Co.  
McNally-Pittsburg Manufacturing Corporation  
Macwhyte Co.  
Marion Steam Shovel Co.

Mancha Storage Battery Locomotive Co.  
Metal & Thermit Corporation  
Mine Safety Appliances Co.  
Morrow Manufacturing Co.  
Mosebach Electric & Supply Co.  
Myers-Whaley Co.  
Nachod & United States Signal Co.  
National Carbon Co., Inc.  
National Electric Coil Co.  
National Malleable & Steel Castings Co.  
National Tube Co.  
New Departure Co.  
Nordberg Manufacturing Co.  
Norma-Hoffman Bearings Corporation  
Ohio Brass Co.  
Osmose Corporation of America  
Penn Machine Co.  
Philco Radio & Television Corporation  
Phillips Mine & Mill Supply Co.  
Portable Lamp & Equipment Co.  
Post-Glover Electric Co.  
Productive Equipment Corporation  
Frank Prox Co.  
Pure Carbon Co., Inc.  
Pure Oil Co.  
Roberts & Schaefer Co.  
John A. Roebeling's Sons Co.  
Robins Conveying Belt Co.  
Robinson Ventilating Co.  
Sanford-Day Iron Works, Inc.  
St. Louis Power Shovel Co.  
Scully Steel Products Co.  
Simplex Wire & Cable Co.  
SKF Industries, Inc.  
Socony Vacuum Oil Co.  
Standard Oil Co. of Indiana  
Stephens-Adamson Manufacturing Co.  
Sterling Pump Corporation  
Sullivan Machinery Co.  
Sun Oil Co.  
Tamping Bag Co.  
Templeton, Kenly & Co.  
Tennessee Coal, Iron & Railroad Co.  
Tide Water Association Oil Co.  
Timken Roller Bearing Co.  
Tool Steel Gear & Pinion Co.  
Bertrand P. Tracy Co.  
W. S. Tyler Co.  
Tyson Roller Bearing Co.  
United Engineers & Constructors, Inc.  
Universal Atlas Cement Co.  
Universal Lubricating Co.  
United States Steel Corporation  
Utility Mine Equipment Co.  
Viking Manufacturing Co.  
Watt Car & Wheel Co.  
Weir Kilby Corporation  
West Virginia Rail Co.  
Western Cartridge Co.  
Westinghouse Electric & Manufacturing Co.  
Williamsport Wire Rope Co.

### New Preparation Facilities

**BERWIND-WHITE COAL MINING Co.**, St. Michael, Pa.: contract closed with Roberts & Schaefer Co. for Stump Air-Flow coal-cleaning plant to handle 140 tons of  $\frac{3}{4}$ x0-in. slack per hour.

**BROWN COAL Co.**, St. Louis, Mo.: contract closed with the Jeffrey Manufacturing Co. for washing addition to present tippie, including one single-compartment Jeffery diaphragm jig, dewatering screen, miscellaneous conveyors and water-clarifying system; capacity, 50 tons per hour.

**CRUMMIES CREEK COAL Co.**, Crummies, Ky.; contract closed with Morrow Manufacturing Co. for rescreening plant for making two grades of coal, including feeder, conveyors, crusher, vibrating screens, rescreens under bin and loading boom; capacity, 300 tons of 6x0-in. coal per hour.

**LUMAGHI COAL Co.**, Collinsville, Ill.: contract closed with the Jeffrey Manufacturing Co., for washing addition to present tippie and domestic coal plant, including two-compartment Jeffery diaphragm jig, dewatering screen, conveyors for coal, refuse and sludge, and a complete Jeffery standard water-clarifying and circulating system; capacity, 150 tons per hour.

**MARTIN MINING Co.**, Martin, Pa.: contract closed with Roberts & Schaefer Co. for complete retarding conveyor and Marcus tippie for loading prepared sizes on four trucks; capacity, 250 tons per hour.

**MONROE COAL MINING Co.**, Revloc, Pa.: contract closed with Roberts & Schaefer Co. for addition to hydro-separator coal-washing plant consisting of one Menzies hydroseparator with a capacity of 100 tons per hour to handle 4x2-in. coal.

**MONROE COAL MINING Co.**, Revloc, Pa.: contract closed with Roberts & Schaefer Co. for addition to present Stump Air-Flow coal-cleaning plant to handle  $\frac{1}{4}$ x0-in. coal at the rate of 120 tons per hour.

**PURSEGLOVE COAL MINING Co.**, No. 2 mine, Purselove, W. Va.: contract closed with United Engineers & Constructors, Inc., for Chance sand-flotation coal washer with auxiliary pumps, piping, sumps, dewatering screens, special conveying and mixing conveyors, new fine-coal screens and complete steel structure to house the equipment; capacity, 300 tons per hour; to be completed in five months.

**UNITED ELECTRIC COAL Cos.** new stripping operation to be constructed at Dunfermline, Ill.: contract closed with the Koppers-Rheolaveur Co. for complete sizing and cleaning plant with a

capacity of 650 tons per hour. Mine-run will be crushed to 12x0 in. before delivery to the seven-track tippie. Picking tables and booms will be provided for lump and egg and 3x0-in. coal will be washed in a Rheolaveur coarse-coal unit followed by a Rheolaveur fine-coal unit for  $\frac{3}{8}$ x0-in. material. Capacity of the washing equipment is 400 tons per hour. Provisions will be made for crushing lump and egg to 6x0, 3x0 or 1 $\frac{1}{2}$ x0 in., and also for crushing all plus 1 $\frac{1}{2}$ -in. washed coal to minus 1 $\frac{1}{2}$ , supplemented by screening into 1 $\frac{1}{2}$ x $\frac{1}{2}$  and  $\frac{3}{4}$ x0-in. sizes. Carpenters dryers will be installed for dewatering  $\frac{3}{8}$ x0-in. coal, and the  $\frac{3}{4}$ x $\frac{3}{8}$ -in. fraction will be heat dried. Mixing conveyors will permit loading of any combinations of the seven standard Illinois sizes.

### Blame High Freight Rates For Anthracite Ills

The commission of five named by Governor Earle of Pennsylvania to study the anthracite industry (*Coal Age*, March, p. 128) in order to eliminate the bootleg mining evil has found its task a large order to carry out. A series of meetings held at Pottsville, Shamokin and Hazleton, March 25-27, brought forth so many suggestions that a tentative report is not expected until some time late in May, followed by final recommendations several weeks later.

At the Shamokin meeting, operators told the commission that excessive freight rates are largely responsible for the continued slump in the industry and the consequent increase in bootlegging. They said high rates caused high prices, which hamper competition with other fuels. But William McMaster, head of the United Truckers' Coal Co., of Philadelphia, testified that the big coal companies—through cooperation with railroads and company-controlled yards—are deliberately keeping the cost of coal excessively high in large cities. He charged flatly that the operators' plea for lower freight rates was "a bluff."

F. E. Learned, vice-president, Philadelphia & Reading Coal & Iron Co., urged the Governor to wipe out bootlegging by issuing a proclamation prohibiting outlaw mining after a certain date. He offered a rehabilitation program asking lower freight rates, a tax on domestic fuel oil and agitation for removal of the Canadian coal tariff. Bootleggers unable to obtain work, he suggested, should be put on the relief rolls after a census has eliminated all those from outside the region who have taken up bootlegging. The coal companies, in return, he said, would absorb the unemployed miners as they are able. Civic leaders and others, however, said that thousands of men must dig bootleg coal or starve because so many mines are shut down.

The Affiliated Coal Distributors and Truckmen's Association presented a resolution asking the State to legalize the bootleg industry for the time being, offering in return to pay a fair tax to

### Coming Meetings

- American Wholesale Coal Association: annual meeting and convention, May 13-15, French Lick Springs Hotel, French Lick, Ind.

- American Mining Congress; annual convention and exposition, May 17-20, Music Hall, Cincinnati, Ohio.

- Fourth short course in coal utilization: May 25-27, University of Illinois, Urbana, Ill.

- Rocky Mountain Coal Mining Institute: annual meeting, May 31-June 2, Cosmopolitan Hotel, Denver, Colo.

- Big Sandy-Elkhorn Coal Operators' Association: annual meeting, June 1, Ashland, Ky.

- American Retail Coal Association: annual meeting, June 7-12, Palmer House, Chicago.

- Illinois Mining Institute: annual summer meeting and boat trip, leaves St. Louis, Mo., June 11 on Str. "Golden Eagle," returning June 13.

- Mine Inspectors' Institute of America: annual convention, June 21-23, Deshler-Wallick Hotel, Columbus, Ohio.

- Mining Society of Nova Scotia: annual meeting, June 21-23, at Nova Scotian, Halifax, N. S.

- American Society for Testing Materials: annual meeting and exhibition, June 28-July 2, Waldorf-Astoria Hotel, New York City.

either the State or coal companies for the land they use. They blamed coal companies for losing trade through "archaic and incompetent methods."

Government control of outlaw mining was suggested at the Shamokin meeting by the Rev. J. J. Petrovits, rector of St. Mary's Church, Kulpmont, a community that has been hard hit by reduced working time at hard-coal collieries. The priest declared that poor management caused the decline of the legitimate anthracite industry. Coal companies lost business, he said, when they offered inferior coal from refuse banks and failed to provide immediate shipments to certain sections. Bootleggers, he added, sold hundreds of thousands of tons of coal in those areas because of prompt deliveries.

At the Hazleton session, witnesses testified that outlaw mining must be stopped by a rigidly enforced official proclamation and work must be found for the idle if the problems of the anthracite industry are to be solved. In response to a question by Commissioner Hoblitzelle, Donald Markle, president, Jeddo-Highland Coal Co., said he would seriously consider any State or federal control if the regulating commission was non-political. He agreed with Commissioner Angell, however, that to effect such an agreement voluntarily throughout the industry would be difficult.

Recommendations presented included:

An immediate census of those engaged in "independent" mining.

Increase of WPA and PWA projects to absorb idle workers.

Placing the price of anthracite in a better competitive position.

Creation of a program for putting men back into the channels of the legitimate anthracite industry.

Stabilizing conditions within the industry.

Seeking better marketing methods.

Launching a program to absorb young men of the hard-coal region into other industries.

Seeking a change in the present relief laws that would permit more ample aid from the State.

Other witnesses included Charles H. Dorrance, president, Penn Anthracite Collieries Co.; F. H. Wagner, general manager, Lehigh Valley Coal Co.; John C. Haddock, president, Haddock Mining Co.; John Yourishin, secretary-treasurer, District 7, United Mine Workers; John C. Gallagher, U.M.W. traveling auditor; T. M. Hicks, Jr., president, Wilkes-Barre Chamber of Commerce; and Thomas Brewer, president, Hazleton Chamber of Commerce.



### To Work Hernshaw Seam

Operations are to be started by the Raleigh-Wyoming Mining Co. in the Hernshaw seam near Edwight, W. Va., within the next few weeks, according to an announcement by the company.

## New Coal-Control Bill Passes Congress And Is Signed by President

WASHINGTON, D. C., April 26 —The Bituminous Coal Act of 1937, as the latest Guffey-Vinson coal-control bill is known, finally was passed by both houses of Congress on April 12 and was signed today by President Roosevelt. The new measure apparently was headed for quick passage in the Senate on April 1 when the chamber was thrown into a turmoil by the introduction of an amendment by Senator Byrnes, of North Carolina, which condemned sit-down strikes. The rider was eliminated on April 5, however, and the bill was passed by the upper house within an hour. Conference named by both houses then brought about an agreement on amendments.

Aside from being divested of its labor regulations, which caused the Supreme Court to invalidate the 1935 coal act, the new measure closely follows the old one (*Coal Age*, September, 1935, p. 389). The latest version now makes no statement in its preamble relative to the production, distribution and use of bituminous coal being "affected with a national public interest," nor is there any mention that enactment of the measure is sought in order "to provide for the general welfare." Also, instead of a commission of five members, seven are called for now, as in the 1936 bill, which was passed by the House but was lost in a filibuster threat in the Senate. While it is still provided that no member of the Commission shall retain any financial interest in the production or transportation of fuel or in equipment for its use, it is now stated that "two members of the Commission shall have been experienced bituminous coal-mine workers" and "two shall have had previous experience as producers." A new subsection 4 of Sec. 2 requires that the Consumers' Counsel "shall annually make a full report of the activities of his office directly to the Congress."

### Excise Tax Now 1 Cent a Ton

The Senate amended the tax provision whereby the excise impost finally was placed at 1c. per ton, with an additional tax of 19½ per cent of the sale price on coal produced by operators not signatories to the code. The 1935 act, on the other hand, imposed a 15 per cent tax with a 90 per cent drawback to producers complying with the code; and the new bill as passed by the House on March 11 carried an excise tax of ½ per cent and a compliance impost of 19½ per cent. Specific power is now conferred on the Commission "to prescribe for code members minimum and maximum prices, and marketing rules and regulations," the district boards from time to time, on their own motion or when directed by the Commission, "proposing" minimum prices. In the 1935 bill, on the other hand, it is provided that the "district boards and code members shall accept and be subject to the jurisdiction

of the Commission to approve or fix minimum and maximum prices." Exemption from the anti-trust laws for compliance with the code is provided in Sec. 4, as follows:

"(d) No action complying with the provisions of this section taken while this act is in effect, or within 60 days thereafter, by any code member or by any district board, or officer thereof, shall be construed to be within the prohibitions of the anti-trust laws of the United States."

### Marketing Areas Changed

With the switches in the table of minimum-price areas in Part II—Marketing the line-up now is:

"Area 1: Eastern Pennsylvania, district 1; western Pennsylvania, district 2; northern West Virginia, district 3; Ohio, district 4; Michigan, district 5; Panhandle, district 6; Southern numbered 1, district 7; Southern numbered 2, district 8; that part of Southeastern district 13 comprising Van Buren, Warren, and McMinn counties in Tennessee.

"Area 2: West Kentucky, district 9; Illinois, district 10; Indiana, district 11; Iowa, district 12.

"Area 3: Southeastern, district 13, except Van Buren, Warren, and McMinn counties in Tennessee.

"Area 4: Arkansas-Oklahoma, district 14.

"Area 5: Southwestern, district 15.

"Area 6: Northern Colorado, district 16; southern Colorado, district 17; New Mexico, district 18.

"Area 7: Wyoming, district 19; Utah, district 20.

"Area 8: North Dakota and South Dakota, district 21.

"Area 9: Montana, district 22.

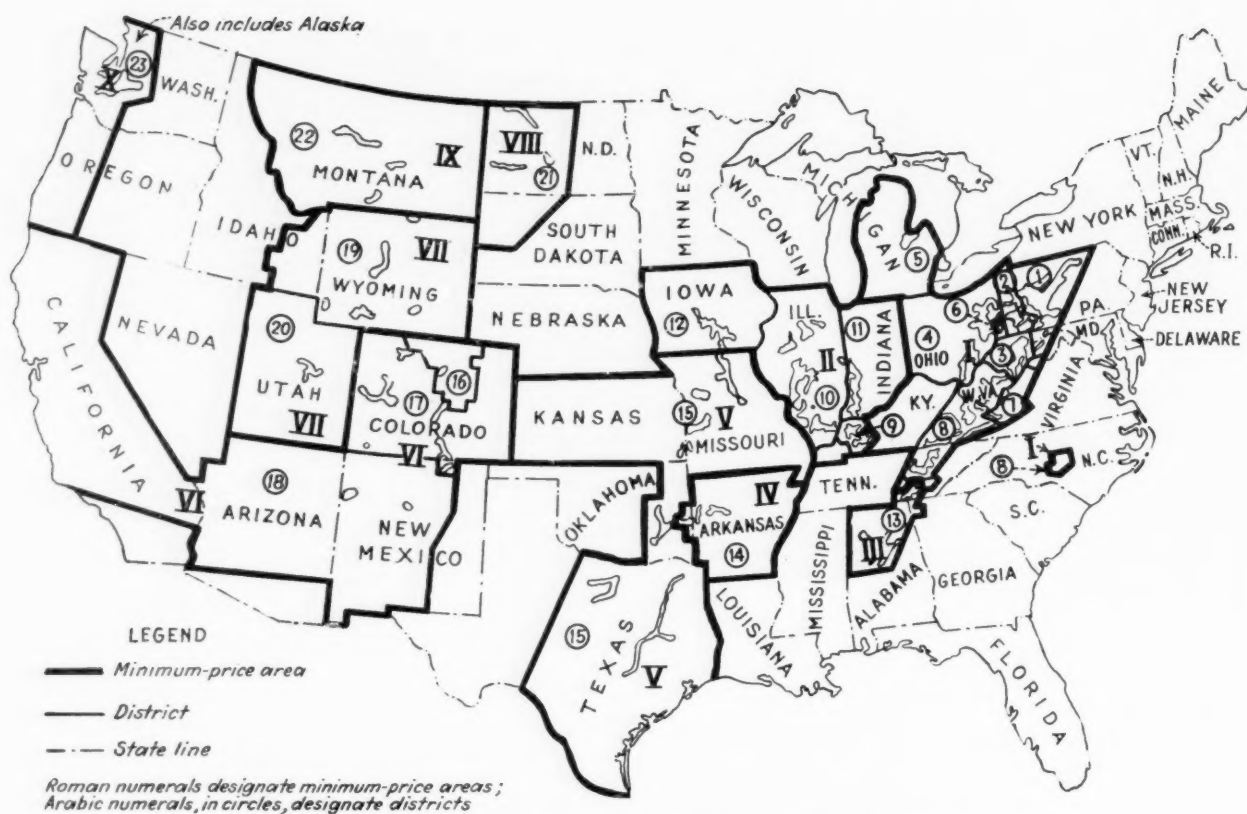
"Area 10: Washington and Alaska, district 23."

Paragraph (e) of the marketing section was amended by the addition of a proviso (shown in *italics*), as follows:

"No coal subject to the provisions of this section shall be sold or delivered or offered for sale at a price below the minimum or above the maximum therefor established by the Commission, and the sale or delivery or offer for sale of coal at a price below such minimum or above such maximum shall constitute a violation of the code: *Provided, That the provisions of this paragraph shall not apply to a lawful and bona fide written contract entered into prior to June 16, 1933.*"

Other additions to the marketing provisions are:

"(k) In the investigation of any complaint or violation of the code, or of any rule or regulation the observance of which is required under the terms thereof, the Commission shall have power by order to require such reports from, and shall be given access to inspect the books and records of, code members to the extent deemed necessary for the purpose



of determining the complaint. Any such order shall be subject to review as are other orders of the Commission.

"(1) The provisions of this section shall not apply to coal consumed by the producer or to coal transported by the producer to himself for consumption by him.

"Sec. 4-A. Whenever the Commission upon investigation instituted upon its own motion or upon petition of any code member, district board, State or political subdivision thereof, or the Consumers' Counsel, after hearing finds that transactions in coal in intrastate commerce by any person or in any locality cause any undue or unreasonable advantage, preference, or prejudice as between persons and localities in such commerce on the one hand and interstate commerce in coal on the other hand, or any undue, unreasonable, or unjust discrimination against interstate commerce in coal, or in any manner directly affect interstate commerce in coal, the Commission shall by order so declare, and thereafter coal sold, delivered or offered for sale in such intrastate commerce shall be subject to the provisions of Sec. 4.

"Any producer believing that any commerce in coal is not subject to the provisions of Sec. 4 or to the provisions of the first paragraph of this section may file with the Commission an application, verified by oath or affirmation for exemption, setting forth the facts upon which such claim is based. The filing of such application in good faith shall exempt the applicant, beginning with the third day following the filing of the application, from any obligation, duty, or liability imposed by Sec. 4 with

respect to the commerce covered by the application until such time as the Commission shall act upon the application. If the Commission has reason to believe that such exemption during the period prior to action upon the application is likely to permit evasion of the act with respect to commerce in coal properly subject to the provisions of Sec. 4 of the first paragraph of this section, it may suspend the exemption for a period not to exceed ten days. Within a reasonable time after the receipt of any application for exemption the Commission shall enter an order granting, or, after notice and opportunity for hearing, denying or otherwise disposing of such application. As a condition to the entry of and as a part of any order granting such application, the Commission may require the applicant to apply periodically for renewals of such order and to file periodic reports as the Commission may find necessary or appropriate to enable it to determine whether the conditions supporting the exemption continue to exist. Any applicant aggrieved by an order denying or otherwise disposing of an application for exemption by the Commission may obtain a review of such order in the manner provided in subsection (b) of Sec. 6."

The right of collective bargaining by employees is covered in these provisions:

"Sec. 9. (a) It is hereby declared to be the public policy of the United States that—

"(1) Employees of producers of coal shall have the right to organize and to bargain collectively with respect to their hours of labor, wages, and work-

ing conditions through representatives of their own choosing, without restraint, coercion, or interference on the part of the producers.

"(2) No producer shall interfere with, restrain, or coerce employees in the exercise of their said rights, nor discharge or discriminate against any employee for the exercise of such rights.

"(3) No employee of any producer or any one seeking employment with him shall be required as a condition of employment to join any association of employees for collective bargaining in the management of which the producer has any share of direction or control."

The principles of the Walsh-Healey Government Purchase Act are embodied in these paragraphs:

“(b) No coal (except coal with respect to which no bid is required by law prior to purchase thereof) shall be purchased by the United States, or by any department or agency thereof, produced at any mine where the producer failed at the time of the production of such coal to accord to his or its employees the rights set forth in subsection (a) of this section.

“(c) On the complaint of any employee of a producer of coal, or other interested party, the Commission may hold a hearing to determine whether any producer supplying coal for the use of the United States or any agency thereof, is complying with the provisions of subsection (a) of this section. If the Commission shall find that such producer is not complying with such provisions, it shall certify its findings to the department or agency concerned. Such

department or agency shall thereupon declare the contract for the supply of the coal of such producer to be canceled and terminated.

"(d) Nothing contained in this act or section shall be construed to repeal or modify the provisions of the Act of March 23, 1932 (ch. 90, 47 Stat. 70), or of the Act of July 5, 1935 (ch. 372, 49 Stat. 449), known as the National Labor Relations Act, or of any other act of Congress regarding labor relations or rights of employees to organize or bargain collectively, or of the Act of June 30, 1936 (ch. 881, 49 Stat. 2036)."

Moving for passage of the bill in the upper house, Senator Guffey said on March 31 that it was the urgent duty of Congress to do so in order to "safeguard our most valuable resource, to preserve the health and welfare of large numbers of people and to preserve a vitally important industry." Through the power of the federal government, and only through that power, can these purposes be accomplished, he said. With the elimination of the labor provisions which caused the Supreme Court to nullify the first Guffey bituminous coal control act in May, 1936, he added, the bill "is clearly within the light of limitations which constitutional interpretation has imposed upon the powers of Congress. To me, the authority of Congress to deal with the industry in the manner prescribed in this bill is unquestioned."

#### Safeguard for Fair Wages

The measure, he asserted, was not hastily drawn in the light of a temporary emergency. It carried the endorsement of "an overwhelming majority of producers and was supported by the men who gain their livelihood by working in the mines," because of their firm belief that only through stabilization of coal prices and prevention of unfair trade practices and indiscriminate price cutting can the producers be maintained in a position where they will be able to pay fair wages and provide adequate working conditions in the mines.

"This is a measure," he said, "for the relief of a nation-wide industry representing today an investment of more than \$3,500,000,000, an industry which in times of prosperity as well as depression continues an unending practice of operating at a loss. Certainly sound national economy cannot permit the continued operation of a basic natural-resource industry under such conditions. The industry employs directly nearly 500,000 men, with hundreds of communities throughout the 28 coal-producing States enjoying prosperity or suffering distress as the fortunes of the coal industry rise or fall."

Senator James J. Davis, of Pennsylvania, former Secretary of Labor and once a coal miner, expressed emphatic approval of the bill because he said he believed it necessary that the nation choose now whether "we shall assist the coal industry to organize itself through the regulation of a powerful commission or shall allow it to become the stage for riots, lawlessness, and labor dis-

turbances such as our country has not known in many years." The success of the legislation, he said, will be largely dependent on the personnel of the commission and the use which it makes of its authority.

Coal is not going out, said Senator Davis; in fact, with increasing evidence that oil reserves are lower than is commonly believed, coal looms as indispensable not only to industry but to householders as well. He pointed to the short-sightedness of the coal industry, however, in having forced what should be its best customers into mining their own coal for self-protection. He asserted that if the coal commission would keep competition open, hold prices within reach of the average consumer, and bring order where there is now confusion, wages would be more equitable and the public would profit from stabilization.

Provisions of the bill that lift Sherman anti-trust law restrictions for producers who comply with the code were attacked by Senator Borah. Calling attention to the power given the commission to set maximum and minimum prices, the Idaho Senator argued that exemption from the anti-trust laws would permit operators to form combinations to fix prices. Such exemption, he held, would result in obvious discrimination, besides dividing the industry into opposing groups composed of those who comply with the code and those who do not.

In response to Senator Barkley's assurance that prices would be set by local boards charged with considering all factors, Senator Borah pointed out that the local boards would be composed largely of producers. "They will be the ones who are to set minimum prices," he added. Bills providing for exemption from the anti-trust laws if codes are complied with are becoming so common, said Mr. Borah, that "pretty soon the entire country will be operating under commissions, and the anti-trust laws will have been entirely repealed."

#### Aid for Carnegie Laboratory

Continuance of activity by the Coal Research Laboratory at the Carnegie Institute of Technology, Pittsburgh, Pa., for four more years has been assured by subscription of approximately \$350,000, according to a report by a committee appointed by the Carnegie board of trustees and headed by Dr. Thomas S. Baker, president emeritus. The committee, which also includes Dr. John Johnson, director of research, United States Steel Corporation, and Howard N. Eavenson, president, Clover Splint Coal Co., announced that the latest list of donors covers a diversified group of interests, including coal-mine owners and railroads.

Of the six industrial organizations that originally gave financial aid to the laboratory, these two have renewed their support: the United States Steel Corporation and the General Electric Co. New contributors include the following:

National Coal Association, W. C. Atwater & Co., Berwind-White Coal Mining Co., Blue Diamond Coal Co., Carter Coal Co., Clearfield Bituminous Coal Corporation, Consolidation Coal Co., H. N. Eavenson, General Coal Co., Island Creek Coal Co., Jamison Coal & Coke Co., Koppers Coal Co., New River Co., Pennsylvania Coal & Coke Corporation, Pittsburgh Coal Co., Pocahontas Fuel Co., Rochester & Pittsburgh Coal Co., Southern Coal & Coke Co., Chesapeake & Ohio Ry., Montour Ry., Norfolk & Western Ry., Virginian Ry., and Union Carbide & Carbon Corporation.

#### ACI Fuel Engineers Discuss Steam-Coal Marketing

Better teamwork between buyer and seller in the selection and application of industrial coals will not only save millions of dollars in the cost of steam generation but will also enable the producer to secure a more remunerative price for his coal, declared speakers at the eighteenth meeting of the fuel engineering division of Appalachian Coals, Inc., held at Cincinnati, Ohio, March 22. Over 80 fuel engineers and executives attended the meeting, which had "Marketing Steam Coals" as its theme. J. E. Tobey, manager of the fuel engineering division, presided.

The buyer, maintained H. A. Glover, assistant to the president, Island Creek Coal Co., is interested primarily not in cheap coal but in cheap steam, and "the only way to know positively that we are buying the best coal for any given plant is to select and buy on the basis of proved steam cost in that plant." In his opinion, the percentage of minus ½-in. size in the coal actually fired was the most important single consideration. Other factors which should influence selection included: uniformity of size, mixing, burning characteristics, B.t.u. input, analytical fusion, grate maintenance, burning tests, equipment adjustment, competent engineering, size tests and the human factor—the operator of the plant.

Coal buyers, said B. E. Tate, chief engineer, power station, National Cash Register Co., are interested not only in cheap coal and cheap steam but also in cheap over-all plant operating cost. "Costs due to maintenance, operating-labor and fixed charges are just as realistic as those enlarged by high first cost of fuel." On the equipment side, stated E. C. Payne, manager, fuel consultation service, Consolidation Coal Co., there usually has been too little teamwork between the various interests concerned with the successful operation of the equipment, particularly in the case of new plants or the modernization of old ones. "Any installation regardless of size," he insisted, "deserves complete cooperation, from its inception, between the consumer's engineers, the general consulting engineer, the fuel specialist, the equipment manufacturer and the coal producers who will be in a position to supply the plant."

## Oil Treatment for Dedusting Studied By Research Group at Battelle

WHAT is the relation between the amount and characteristics of oil used to treat coal for elimination of dust to the effectiveness and permanence of such treatment? Research to find the answer to this question recently was started at Battelle Memorial Institute, Columbus, Ohio, and preliminary data on the testing methods and results have just been released. The project is sponsored jointly by Bituminous Coal Research, Inc., Standard Oil Co. (New Jersey), Sun Oil Co. and the Viking Manufacturing Co.

Fig. 1 shows the special treating machine which was constructed for the investigation. From the hopper on top the coal feeds through a gate, which may be adjusted to control the rate of feed on the belt, and drops onto a short plate inclined at 45 deg. which simulates a chute in a tippie. The nozzle through which the oil is atomized may be adjusted relative to the chute to give complete coverage of the coal stream. Oil is pumped from the calibrated bottle on the side of the machine through a thermostatically controlled heater; a continuous bypass of oil back to the bottle insures that all of the oil applied is heated to the desired temperature.

The temperature is measured just before the nozzle. Either hot or cold oil may be applied and the pressure at the

nozzle varied at will. Although relatively small samples of coal may be treated with accuracy, as the coal can be exactly weighed and the oil can be measured to 0.01 qt., the scale of the equipment is large enough to insure that the results will be typical of those expected in actual tippie operation at the mines.

In measuring the dustiness of the coal the method developed by A. R. Powell and C. C. Russell, of the Koppers Research Corporation ("Method for Determining the Dustiness of Coal and Coke," *Ind. Eng. Chem., Analytical Edition*, Vol. 5, pp. 340-341), is used. The apparatus consists of a tight metal box 18 in. square and 5 ft. high. A sample of 50 lb. of coal is placed on a slide 1 ft. from the top of the box. The slide is quickly pulled out; this allows the coal to drop 4 ft. into a removable box at the bottom.

Five seconds after dropping the coal, two polished metal plates, on which the dust settles, are inserted 2 ft. from the bottom of the box. The upper plate is withdrawn after 2 minutes and the lower plate 8 minutes later. The dust on the two plates is weighed separately and the dustiness index is calculated at 40 times the weight in grams. This value has been called the dustiness in grams per ton, but must not be con-

sidered as the absolute or total quantity of dust in a ton of coal. It is preferably thought of as a dustiness index and is considered an excellent relative measure of the dust produced when handling coal.

Fig. 2 shows the relation between the dustiness of a 0x1½-in.—i.e., a 1½-in. nut, pea and slack—coal and the amount of oil (Saybolt viscosity, 200 seconds at 100 deg. F.) when tested one week after treatment. The oil was applied under a pressure of 125 lb. and at a temperature of 200 deg. F. at the nozzle. The curves show that the application of the oil was highly effective in reducing the dust. With only 1 qt. of oil per ton on this very dusty coal, of which 36 per cent passed a ¾-in. round-hole screen, the coarse dust was reduced 65 per cent and the float dust was reduced 82 per cent. With 4 qt. per ton, the re-

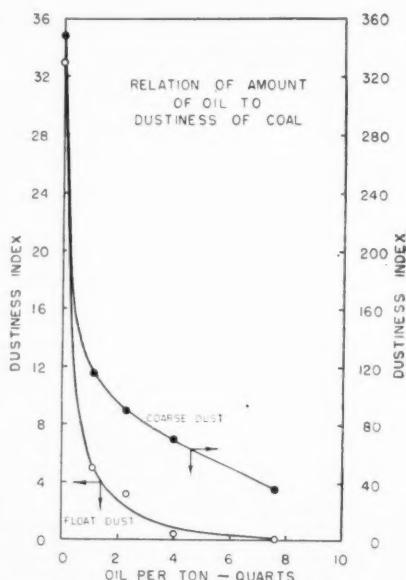


Fig. 2—Relation of dustiness of a 0x1½-in. coal to quantity of an oil (200 viscosity at 100 deg. F.) one week after application.

duction of the coarse dust was 80 per cent and for the fine dust it was 98 per cent.

Fig. 3 is a photograph of the weighing bottles containing the coarse dust corresponding to the curve in Fig. 2. This shows very well the great reduction in the quantity of dust obtained by application of the oil. A second brand of 200-viscosity oil gave similar results. Tests are being continued with oils of other viscosities. Samples are being exposed to the weather to determine the permanence of the treatment and tests to determine the effect of oil treatment on oxidation and spontaneous combustion are among the other items in this program of research.

### Investigations Cover Wide Range

In addition to this study of oil treatment and its effectiveness in dedusting, Battelle Memorial Institute also is carrying on a number of other research projects for Bituminous Coal Research,

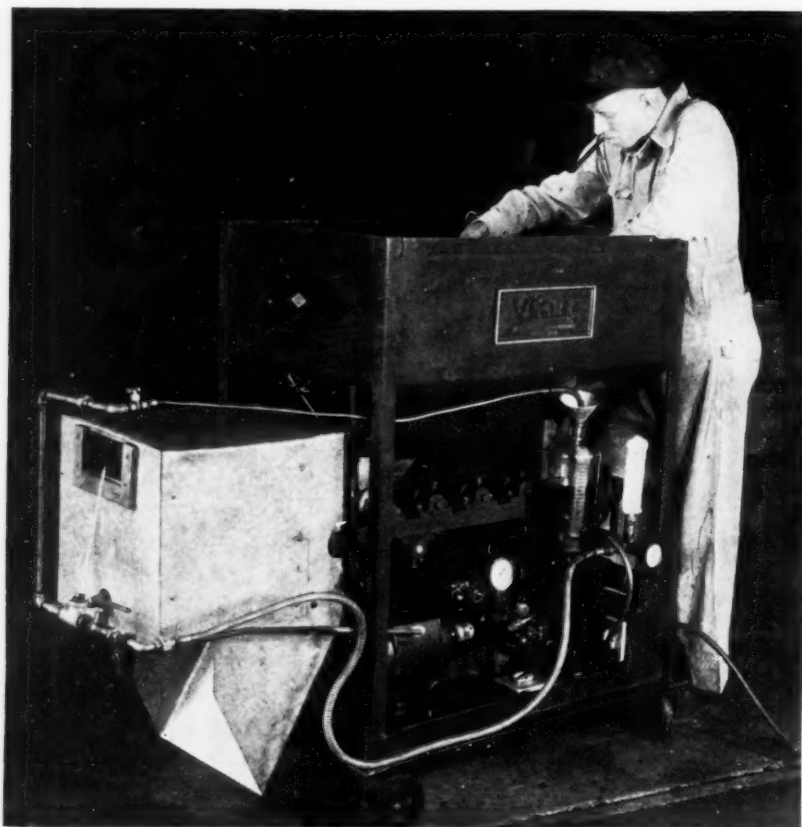


Fig. 1—Coal treating machine used in Battelle research project.

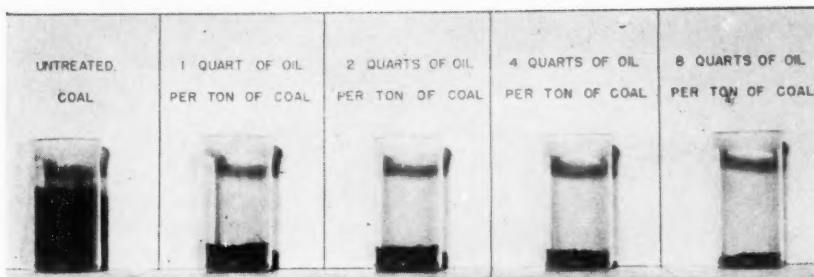


Fig. 3—Weighing bottles containing dust from first settling period.

Inc. One of these is an investigation of the characteristics of coals for small stokers. Tests have been run with Thick Freeport, Pocahontas, Pittsburgh seam, Island Creek, Millers Creek and Franklin County (Illinois) coals. Upon recommendation of the technical advisory committee of the operators' research organization, special study will be made of the problem of coke-tree formation and the difficulties which that formation causes.

Research into problems connected with the use of coal on industrial stokers also has been under way for some time. A report on the recirculation of flue gases as a method for the control of clinker with industrial stokers has been submitted to the technical advisory committee for its consideration. Studies are being made of combustion in underfeed stokers. A number of field surveys of industrial plant operation also have been made.

### Anthracite Industry Speeds Sales-Promotion Work

Anthracite is carrying the tonnage battle deeper into the enemy's camp this spring with a special drive to increase the use of hard coal in service water heating. Anthracite Industries, Inc., is sponsoring a test advertising campaign in key cities in the New England and Middle Atlantic States. Retailers have been invited to join with plumbing and heating contractors in promoting the sale and installation of automatic anthracite water heaters. Further cooperation is being enlisted in a campaign addressed to the plumbing and heating contractors through trade publications serving those groups.

The industry also has been participating actively in National Home Show weeks in various cities in anthracite-consuming territory, including Philadelphia and Reading, Pa.; Buffalo, N. Y.; Newark, N. J.; and Baltimore, Md. At the Baltimore show over 600 inquiries on anthracite-burning equipment were received. A permanent exhibit, sponsored by Anthracite Industries, Inc., has been opened at the Architects' Sample Corporation Building, New York City. An advertising campaign in publications reaching architects and builders also has been launched.

Individual hard-coal producers are backing up the general campaigns with special appeals to their own retail dis-

tributors. Delaware, Lackawanna & Western Coal Co., for example, is capitalizing on the general drive by pushing the sale of the "blue coal" hot-water regulator. This company has issued a special sales manual to be used by retailers in tying in with the hot-water campaign. Early reactions from these drives are reported to be enthusiastic.

### Personal Notes

CLAYTON G. BALL, geologist and coal technologist formerly with the State Geological Survey of Illinois and more recently with the Bell & Zoller Coal & Mining Co., has become associated with Paul Weir, consulting mining engineer, Chicago.

J. D. BOONE, JR., has been appointed superintendent by the Fayette Smokeless Coal Co. at Fayette, W. Va.

WILLIAM H. CONYNGHAM has been elected chairman of the board of directors of the Lehigh Valley Coal Co., Wilkes-Barre, Pa., vice Frank Wheaton, deceased. Mr. Conyngham also has been on the board of the Lehigh Valley R.R. and has been connected with Burns Brothers and with the Morris Run Coal Mining Co.

CARL CRAIG has been made foreman of the Hawley mine of the Preston County Coke Co., Cascade, W. Va.

CHARLES DORRANCE, of Scranton Pa., has been made vice-president-in-charge of operations of the Consolidation Coal Co., with headquarters in Fairmont, W. Va. For a number of years Mr. Dorrance has been active in the anthracite industry, being president of the Penn Anthracite Collieries Co. and the Southern Anthracite Co. as well as receiver for the Temple Coal Co. A graduate of Lehigh University, he soon became associated with the Lehigh Coal & Navigation Co., later becoming manager of the Harwood Coal Co. Beginning in 1915 he held various official positions with the Hudson and Shanferoke coal companies. From 1924 through 1931 he was consulting engineer for the Hudson, Glen Alden, Lehigh Valley and Philadelphia & Reading companies.

EMIT FERRELL has been named foreman in the top seam of No. 32 mine of the Red Jacket Coal Co., Red Jacket, W. Va.

V. G. GANDY has been appointed general superintendent of the Getty and Green Valley mines of the Reppert Coal Co., in Harrison and Taylor counties, West Virginia.

J. F. GRAVES, for the past 23 years connected with the Consolidation Coal Co., has been appointed vice-president in charge of sales of the Bethlehem Fairmont Coal Co., with offices in the Fidelity Building, Baltimore, Md. The company's operations are at Shinnston, W. Va.

IRA HAMBURGER has been made foreman of Stanaford No. 1 mine of the Koppers Coal Co., Stanaford, W. Va.

WILLIAM D. HELLER, formerly with the Saxton Coal Mining Co., Terre Haute, Ind., has been named outside foreman of the Isabella mine of the Weirton Coal Co., Isabella, Pa.

CHARLES F. HUBER returned to his former post as chairman of the board of directors of the Glen Alden Coal Co., Scranton, Pa., on April 1 after nearly two years of drafted service as administrator of the anthracite industry (*Coal Age*, July, 1935, p. 313). His resignation as administrator comes after 22 months' effort to wipe out unfair trade practices and restore confidence in the hard-coal industry.

HARRY G. KENNEDY, commissioner and combustion engineer for the Kanawha Coal Operators' Association, of which his father is executive secretary, has been elected president of the Transportation Club of Charleston, W. Va.

C. M. LITTLEJOHN has been appointed foreman of the Caperton mine of the Premium Smokeless Coal Co., Elverton, W. Va.

CECIL MAYNOR has been made safety director of the Lillybrook Coal Co., Lillybrook, W. Va.

V. J. MOORE has been named mine foreman by the Fayette Smokeless Coal Co., Fayette, W. Va.

JAMES E. MURRAY has been appointed foreman of the No. 9 mine of the Jamison Coal Co., Farmington, W. Va.

THOMAS PARK has been made superintendent of Isabella mine of the Weirton Coal Co., Isabella, Pa. He was formerly foreman of that mine.

T. T. REESE has been named superintendent of Lillybrook Nos. 1 and 3 mines of the Lillybrook Coal Co., Lillybrook, W. Va.

JOHN RISKO has been appointed foreman of the Dabney mine of the Hutchinson Coal Co., Kleencoal, W. Va.

G. W. SEILER, general sales manager of the Lehigh Navigation Coal Co., Philadelphia, Pa., has resigned from that position to go into business for himself.

ARCHIE SMITH has been named foreman of Nos. 1 and 2 mines of the

Leccony Smokeless Coal Co., Besoco, W. Va.

HOWARD SCHWENEBRATEN, formerly mine foreman for the Lincoln Gas Coal Co., Lincoln Hill, Pa., has accepted a similar position at the Isabella mine of the Weirton Coal Co., Isabella, Pa.

S. H. WADE has been made mine foreman by the Detroit Mining Co., Gordon, W. Va.

M. R. WEST has been appointed superintendent by the Detroit Mining Co., Gordon, W. Va.

BUTLER WILSON has been named foreman of the No. 2 mine of the E. C. Minter Coal Co., Rhodell, W. Va.

LEE LONG, vice-president, Clinchfield Coal Corporation, Dante, Va., has been chosen president of the newly organized Breaks Reserve and Reforestation Association, launched at a dinner given by Mayor K. J. Day, of Pikeville, Ky. Host DAY was named vice-president, and HARRY LAVIERS, vice-president, South-East Coal Co., Paintsville, Ky., was made secretary-treasurer.

L. R. WEBER, president, Liberty Fuel Co., Salt Lake City, Utah, was elected president of the Utah Coal Operators' Association at the annual meeting, April 7, succeeding Otto Herres, general manager, United States Fuel Co. L. E. ADAMS, vice-president, Spring Canyon and Royal coal companies, was elected vice-president, and B. P. MANLEY was renamed executive secretary.

### Permissible Plate Issued

One approval of permissible equipment was issued by the U. S. Bureau of Mines in March, as follows:

Northwestern Improvement Co.: shearing machine with drill; 20-hp. motor, 440 volts, a.c.; Approval 314-A; March 2.

### Short Course in Mining

West Virginia University will hold its 25th annual short course in coal mining June 7 to July 17, according to an announcement by C. E. Lawall, director, School of Mines, of the university. Classes will be held at the university, Morgantown; Woodrow Wilson High School, Beckley, and Logan High School, Logan, W. Va. Tuition will be free and the only entrance requirement is a desire to get ahead.

### Nine Die in Kramer Blast

Two explosions on March 27 in the Kramer mine of the Northwest Mining & Exchange Co., ten miles south of Dubois, Pa., killed nine miners. Two men were in the mine when the first blast occurred, but when a squad of seven others went into the workings to rescue the first two their lives also



The late Andrew M. Fine

were snuffed out by a second blast which occurred 45 minutes later. The mine normally employs 1,200 men, but the fact that it was Saturday accounted for the few workers present.

### Mine Fatality Rate Lower

Coal-mine accidents caused the deaths of 73 bituminous and 15 anthracite miners in February last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 41,740,000 tons, the bituminous death rate in February was 1.75 per million tons, compared with 2.04 in the preceding month and 2.21 in February, 1936. The anthracite fatality rate in February last was 4.45, based on an output of 3,368,000 tons, as against 4.47 in the preceding month and 5.30 in February of last year. For the two industries combined, the death rate in February last was 1.95, compared with 2.27 in the preceding month and 2.66 in February, 1936.

Comparative fatality rates for the first two months of 1936 and 1937, by causes, are given in the following table:

#### FATALITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES \*

Cause	January and February, 1936 and 1937								Bituminous-3	
	Bituminous		Anthracite						Anthracite	
	Number Killed	Killed per Million Tons	Number Killed	Killed per Million Tons	Number Killed	Killed per Million Tons	Number Killed	Killed per Million Tons	Number Killed	Killed per Million Tons
Falls of roof and coal..	112	93	1.384	1.125	39	16	3.169	2.165	1.619	1.210
Haulage.....	32	34	.395	.412	4	4	.325	.541	.386	.422
Gas or dust explosions:										
Local explosions....	3	1	.037	.012	5	....	.406	....	.086	.011
Major explosions....	8	....	.099	....	....	....	....	....	.086	....
Explosives.....	8	1	.099	.012	4	1	.325	.135	.129	.022
Electricity.....	4	8	.049	.097	1	1	.081	.135	.053	.100
Mining machines.....	5	3	.062	.036	....	....	....	....	.053	.033
Other machinery.....	1	1	.012	.012	1	....	.081	....	.021	.011
Miscellaneous:										
Minor accidents....	5	3	.062	.036	7	4	.569	.541	.129	.078
Major accidents....	....	....	....	....	....	....	....	....	....	....
Shaft:										
Minor accidents....	3	6	.037	.073	1	1	.081	.135	.043	.078
Major accidents....	....	....	....	....	....	....	....	....	....	....
Stripping or open-cut..	5	3	.062	.036	2	3	.163	.406	.075	.067
Surface.....	7	12	.086	.145	5	3	.406	.406	.129	.166
Grand total.....	193	165	2.384	1.996	69	33	5.606	4.464	2.809	2.198

\* All figures subject to revision.

### Andrew M. Fine Dies

Andrew Mellick Fine, 61, vice-president of the Hudson Coal Co., died April 20 at his home in Scranton, Pa., after an illness of several months. Born in Scranton, he began his career with the Delaware & Hudson Railroad Co. nearly fifty years ago, later joining the Hudson Coal Co., its mining subsidiary. He had been vice-president and a director since 1919. He took an active part in labor negotiations, being a member of the committee of operators which, with a union group, settled the 1926 anthracite strike.

### James Bonnyman Is Dead

James Bonnyman, 57, president of the Blue Diamond Coal Co., with offices in Cincinnati, Ohio, and operations in Kentucky, Tennessee and Virginia, died April 9 of a heart attack at his home in Cincinnati. A graduate of the University of Kentucky, he had had a long and varied career beginning in Birmingham, Ala. After a period in the railroad industry he held various official positions with the Stearns Coal Co. of Kentucky, Central of Georgia Ry., and the Birmingham Coal & Iron Co. In 1912 he organized and became president of the Brookside-Pratt Mining Co., Birmingham, remaining until 1922, when he became president of the Blue Diamond company. He also was a director of Appalachian Coals, Inc.

### Financial Reports

Davis Coal & Coke Co. and subsidiaries—Net income for 1936, \$123,673, against \$133,078 profit in 1935.

Hudson Coal Co.—Net profit for 1936, \$335,040 after depletion, depreciation, interest on funded debt and on loans, and taxes, compared with net loss of \$666,221 in 1935.

Island Creek Coal Co. and subsidiaries—Net profit for 1936, \$1,238,421, against \$1,153,270 profit in 1935.

Lehigh Valley Coal Corporation—Net profit for twelve months ended March

31, \$266,051, compared with net profit of \$648,118 in the preceding twelve months. Net profit for the March quarter was \$93, against \$557,039 profit in the first quarter of 1936.

New River Co.—Net profit for 1936, \$357,701, compared with \$404,567 profit in 1935.

Northwestern Improvement Co.—Net income for 1936, \$286,332, compared with \$598,020 income in 1935.

Pennsylvania Coal & Coke Corporation—Net loss in 1936, \$28,188 including income from allied companies operated by virtue of Clearfield Bituminous Coal Corporation lease. In 1935 the net income was \$77,007.

Philadelphia & Reading Coal & Iron Corporation and subsidiaries—Net loss for 1936, \$3,908,974 after surtax, against loss of \$6,100,791 in 1935. Of 1936 loss, \$3,663,069 was assignable to anthracite activities, compared with a corresponding deficit of \$5,124,544 in 1935.

Pocahontas Coal & Coke Co.—Net income for 1936, \$1,179,927, compared with net income in 1935 of \$913,107.

Pond Creek Pocahontas Co.—Net profit for 1936, \$238,020, against \$402,990 profit in 1935.

Westmoreland Coal Co.—Net profit for 1936, \$68,294, against \$23,548 profit in 1935.

### Plea for TVA Stay Denied

The Georgia Power Co. on April 5 lost its plea before the United States Supreme Court against extension of TVA power-distribution facilities into the company's area in Georgia. The court denied a request to stay an injunction order which enjoins the utility from pressing a federal court suit started in Tennessee to halt TVA invasion of the Georgia company's field.

### Pittston No. 14 Leased

No. 14 colliery of the Pittston Co., Pittston, Pa., which has been idle for six years, was leased on April 3 to an independent mining company headed by Edward M. Green, of Pittston, and William S. Jermyn, of Scranton.

### MacAlpin Taps No. 4 Seam

The MacAlpin Coal Co. has tapped the Pocahontas No. 4 seam at its MacAlpin mine, in Raleigh County, West Virginia, with two slope entries and an air shaft 140 ft. deep, according to an announcement by Superintendent W. B. Crickmer. Construction of the slope entries and shaft, which was started five months ago, was completed on April 1. When operation gets under full swing, more than 300 men will be employed.

The company also is opening a new mine on the Grandview side of Piney River, opposite Stanaford. John Laing, Charleston, is president of the company, which also has mines at Glen Morrison and on Cabin Creek.

## Mine Workers Win Wage Increases With Higher Overtime Pay

**T**ERMS of a new agreement granting increases in basic hourly and piecework rates and establishing time-and-one-half for overtime were ratified by the Appalachian joint conference of operators and miners at the Park Central Hotel, New York City, on the afternoon of April 2. Ratification ended the shortest suspension on record in the history of major coal-wage negotiations where a new contract had not been signed prior to the expiration of an existing agreement. Application of these wage advances to all bituminous fields, together with increased production costs due to taxes and higher prices for materials and supplies, will boost the nation's annual fuel bill approximately \$100,000,000, according to estimates of spokesmen for the producers.

The new contract, which runs until March 31, 1939, carries an increase of 50c. per day for all day and monthly men except miners employed on a day or hourly rate on mechanical loading and conveyor devices and all employees engaged in production in strip pits. Workers in these excepted categories are advanced 70c. per day. Yardage and deadwork rates are increased 10 per cent. Basic increases in tonnage rates are as follows: Pick mining, 9c. per ton; machine loading, 8c.; shortwall cutting rates, 1c.; track-mounted cutting-machine rates, 0.7c. per ton. "Where tonnage, footage or yardage rates are paid on conveyors or other mechanical loading devices, the percentage of increase to be added to such rates shall be the same percentage of increase as is applied to the basic loading and cutting rates." Basic rates in effect in the Appalachian districts under the new contract are shown in Tables I to IV.

Higher rates for overtime—an innova-

tion in coal-mine agreements—have been incorporated in an amendment to the "Maximum Hours and Working Time" section of the 1935-37 contract (*Coal Age*, November, 1937, p. 477) and read as follows:

"Work by mine workers paid by hour or day in excess of 7 hours in one day or 35 hours in any one week shall be paid for at the rate of time-and-one-half with the following exceptions:

"Employees engaged at power houses, substations, and pumps operating continuously for 24 hours daily are especially exempted from the 7-hour day and the time-and-one-half provisions. Special exemptions for individual employees other than those named above when 24 hours' continuous operation daily is required are subject to arrangement between mine management and district officers without time-and-one-half for overtime. Employees so especially exempted are limited to 8 hours per day and 40 hours per week and time-and-one-half for time worked in excess thereof.

#### Retains 7-Hour Day

"The 7-hour day, 5-day week (35 hours per week), as provided in this agreement, shall prevail.

"The following classes of mine workers are excepted from the foregoing provisions as to the maximum hours of work:

"All mine workers engaged in the transportation of men and coal shall work the additional time necessary to handle man-trips and all coal in transit and shall be paid the regular hourly rate for the first 7 hours and time-and-one-half for all overtime.

"Outside employees engaged in the dumping, handling and preparation of coal, and the manufacture of coke, shall work the additional time necessary, not to exceed 30 minutes, to dump and prepare the coal delivered to the tipples each shift, and complete the usual duties incidental to the operation of coke ovens, and shall be paid the regular hourly rates for the first 7 hours and time-and-one-half for overtime not to exceed the 30 minutes hereinbefore stated."

Proposals for a joint study of mechanization problems, submitted by the United Mine Workers at the opening of the joint conference Feb. 17, are given recognition in modified form in the new agreement. The miners had asked for the creation of a commission to make a study "with the object in view of establishing uniformity of rates of pay and conditions of employment in and between districts" in the Appalachian area, "and alleviating the problem of the displacement of men." The commission was to complete its work so that the joint conference could be convened not later than March 1, 1938, to act on the commission's recommendations.

As modified for incorporation in the

**Table I—Base Hourly and Day Rates Northern Appalachian Territory\***

The following hourly and day wage rates shall be paid in all mines in the Pennsylvania, Ohio, Michigan, Northern Pan-Handle of West Virginia, and the Northern West Virginia districts for the classification of occupations shown herein.

Classification of Occupations	Hourly Rate	Day Rate
<i>Inside</i>		
Motormen, rock drillers....	\$0.88	\$6.16
Drivers, brakemen, spraggers, snappers, coal drillers, trackmen, wiremen, bonders, timbermen, bottom cagers.....	.857	6.00
Pumpers, trackmen helpers, wiremen helpers, timbermen helpers, and other inside labor not classified..	.823	5.76
Greasers, trappers, flaggers, switch throwers.....	.629	4.40
<i>Outside</i>		
Bit sharpener, car dropper, trimmer, car repairmen, dumpers.....	.749	5.24
Sand dryers, car cleaners, other able bodied labor..	.714	5.00
Slate pickers.....	.629	4.40
* Skilled labor not classified to be paid in accordance with the custom at the mine.		

\* Rates for Maryland and Upper Potomac district are shown in Table II.

new contract, the Mechanized Mining Commission set up is "to make a joint study of the problems arising from mechanization of bituminous coal production by the use of conveyors and mobile loading machines in the area covered by the Appalachian joint wage agreement, including the problem of displacement of employees." The commission is to organize within 60 days. Its report and recommendations, however, are to be made to the joint wage conference convening March 14, 1939.

M. L. Garvey, Pocahontas Fuel Co.; J. D. A. Morrow, president, Pittsburgh Coal Co.; Charles O'Neill, president, United Eastern Coal Sales Corporation; L. T. Putman, general superintendent, Raleigh-Wyoming Mining Co.; D. A. Reed, general manager of operations, Consolidation Coal Co.; W. L. Robison, president, Youghiogheny & Ohio Coal Co.; P. C. Thomas, vice-president, Koppers Coal Co.; and L. E. Woods, president, Crystal Block Coal & Coke Co., are named as operator members of the commission. Representatives of the United Mine Workers on the commission are: John L. Lewis, international president; Philip Murray, international vice-president; Thomas Kennedy, international secretary-treasurer; Van A. Bittner, president, District 17; Samuel Caddy, president, District 30; P. T. Fagan, president, District 5; James Mark, president, District 2; and John Owens, president, District 6.

The joint committee on differentials set up under the 1935-37 contract has been abolished. That committee at the outset of its organization declined to consider North-South base differentials on the ground that the time allotted for the completion of its report was inadequate for a proper study of that thorny question. Procedure for handling other differential disputes was outlined, but during its existence the committee fathered no changes. At the Feb. 17 meet-

**Table II—Basic Hourly and Day Rates—Southern Appalachian Territory**

The following hourly and day wage rates shall be paid in all mines in the Maryland and Upper Potomac district, including Grant, Mineral and Tucker counties of West Virginia; Kanawha, Logan, Williamson, Big Sandy-Elkhorn, Hazard, Harlan, Virginia, Southern Appalachian, New River, Pocahontas-Tug River, Winding Gulf, Greenbrier, Upper Buchanan, Harlan and Virginia districts for the classifications of occupation shown herein:

Classification of Occupations	Hourly Rate	Day Rate
<i>Inside</i>		
Motormen, rock driller.....	\$0.823	\$5.76
Drivers, brakemen, spraggers, snappers, coal drillers, trackmen, wiremen, bonders, timbermen, bottom cagers.....	.80	5.60
Pumpers, trackmen helpers, wiremen helpers, timbermen helpers, and other inside labor not classified..	.766	5.36
Greasers, trappers, flaggers, switch throwers.....	.571	4.00
<i>Outside</i>		
Blt sharpener, car dropper, trimmer, car repairmen, dumpers.....	.691	4.84
Sand dryers, car cleaners, other able bodied labor..	.657	4.60
Slate pickers.....	.571	4.00
Skilled labor not classified to be paid in accordance with the custom at the mine.		



**Sealing Another Peace Pact in Bituminous Labor Relations**

John L. Lewis, president, United Mine Workers, and Charles O'Neill, chairman, Appalachian operators' negotiating committee, put their "John Hancocks" on the dotted line as joint conference ratifies the new Appalachian wage agreement.

ing of the joint conference, Mr. O'Neill intimated that the miner members of the differential committee had given "little help" in any efforts to reach decisions and Mr. Lewis mildly denied "the soft impeachment."

With the exception of the addition of the Upper Buchanan Smokeless Coal Operators' Association and change in name of two Pennsylvania organizations, the parties named in the new contract are the same as those listed in the preamble to the 1935 agreement. The Central Pennsylvania Coal Producers' Association has been substituted for the Eastern Bituminous Coal Association and the Western Pennsylvania Coal Producers' Association for the Western Pennsylvania Coal Control Association. Other operating groups named as parties to the agreement are:

Georges Creek and Upper Potomac Coal Association, Somerset County Coal Operators' Association, Ohio Coal Control Association, Michigan Coal Operators' Association, Northern Panhandle of West Virginia Coal Operators' Association, Northern West Virginia Subdivisional Coal Association, Operators' Association of Williamson Field, Big Sandy-Elkhorn Coal Operators' Association, Hazard Coal Operators' Association, Kanawha Coal Operators' Association, Logan Coal Operators' Association, Southern Appalachian Coal Operators' Association, New River Coal Operators' Association, Pocahontas Operators' Association, Winding Gulf Operators' Association, Greenbrier Coal Operators' Association, and "Harlan County, Kentucky, coal operators, signatory hereto, and Virginia coal operators, signatory hereto."

When the agreement was presented for signature at the Park Central Hotel meeting, however, no representative

came forward to sign on behalf of the Michigan producers and spokesmen for the Hazard and Southern Appalachian

**Table III—Basic Tonnage Rates for Northern Appalachian Territory\***

	Per Net Ton Run of Mine Coal
<i>Western Pennsylvania</i>	
Pick mining, thin vein.....	\$0.98
Pick mining, thick vein.....	.93
Machine loading, thin vein.....	.76
Machine loading, thick vein.....	.72
Cutting, shortwall machine, thin vein.....	.11
Cutting, shortwall machine, thick vein.....	.10
<i>Central Pennsylvania</i>	
Pick mining.....	.98
Machine loading.....	.76
Cutting, shortwall machine.....	.11
<i>Southern Somerset County, Pennsylvania</i>	
Pick mining.....	.98
Machine loading.....	.76
Cutting, shortwall machine.....	.11
<i>Connellsville, Pennsylvania</i>	
Pick mining.....	.84
Machine loading.....	.64
Cutting, shortwall machine.....	.09
<i>Westmoreland—Greensburg, Pennsylvania</i>	
Pick mining.....	.93
Machine loading.....	.72
Cutting, shortwall machine.....	.10
<i>Thick Vein Freeport, Pennsylvania</i>	
Pick mining.....	.93
Machine loading.....	.72
Cutting, shortwall machine.....	.10
<i>Northern West Virginia</i>	
Pick mining.....	.84
Machine loading.....	.665
Cutting, shortwall machine.....	.095
<i>Ohio and Pan-Handle District of Northern West Virginia</i>	
Pick mining.....	.98
Machine loading.....	.76
Cutting, shortwall machine.....	.11
<i>Michigan</i>	
Pick mining.....	1.192
Machine loading.....	.931
Cutting, shortwall machine.....	.161

Cutting rates on track-mounted machines in all districts shall be increased 70 per cent of the amount of increase on shortwall machines.

\* Rates for Maryland and Upper Potomac district are shown in Table IV.

fields withheld assent pending, they said, information on the attitude to be taken by competitors not parties to the agreement. Virginia representatives took the same position as the Hazard and Southern Appalachian spokesmen. William Taylor, executive vice-president, Valley Camp Coal Co., signing on behalf of that company and its subsidiaries in the West Virginia Panhandle, stated that the Northern Panhandle of West Virginia Coal Operators' Association was inactive at the present time.

As finally worked out, the new agreement represents substantial compromises by both operators and miners. The operators' pre-conference proposal for a return to the 8-hour day with no increase in daily or base tonnage rates (*Coal Age*, January, 1937, p. 36) soon went by the boards. Spokesmen for the miners' union also abandoned their demand for a 6-hour day (*Coal Age*, March, 1937, p. 134). Abandonment, too, was the fate of the proposals for a guaranteed work-year and two weeks' vacation with pay. And during the course of the long subcommittee parleys, piecework increase demands were whittled down substantially.

Although union representatives gave up their demands for double time for Sundays and holidays, they refused to yield on time-and-one-half for other overtime and resisted all suggestions to pare their demand for an increase of 50c. per day for day and monthly men. While a number of operators argued that the position of the industry did not warrant any increase in wage rates, there was a strong undercurrent of feeling that, with so many other major industries boosting pay, bituminous coal producers could not hold out against an advance.

#### Stage Battle on Overtime

As March drew to a close, operator members of the joint scale subcommittee of four reached an agreement with the two union members of that committee on the basis finally ratified April 2. When the terms of the proposed contract were submitted to the full committee, however, opposition to acceptance developed in the operators' ranks. Higher pay for overtime became the sticking point. Edward McGrady, Assistant Secretary of Labor, appeared on the scene, but was not invited to assume the rôle of mediator, as the coal producers preferred to settle the question of a new contract without outside intervention.

A meeting of the joint conference to act on the report of the scale committee was called for the afternoon of March 31, postponed after a delay until the evening and then postponed again until the next afternoon. This performance was repeated April 1. Operators went into district huddles. Hurry-up calls were sent out summoning executives who had returned to their homes or who had not participated in earlier conferences. In the meantime, the scale committee kept doggedly in session until assured that its report would be ratified by the full joint conference.

The air was still tense when this conference reconvened and the roll call on

ratification started. Tension increased as spokesmen for the operators in the Hazard, Southern Appalachian and Virginia fields voted "no" on the ground that they could not bind themselves until they knew what their competitors not parties to the New York negotiations would do. Following whispered conferences after the roll-call had ended, Duncan C. Kennedy, chairman of the meeting, announced that the spokesmen for the dissenting fields had changed their "noes" to "not voting." He thereupon declared the new contract, already accepted by the representatives of the United Mine Workers, unanimously adopted.

#### Start Trek to Mines

With the basis agreement signed, work generally was resumed throughout the Appalachian area and in the outlying fields on April 5 without waiting for the negotiation of individual district contracts. Outstanding exceptions were Alabama, the Southern Appalachian

Table IV—Basic Tonnage Rates for Southern Appalachian Territory

Maryland and Upper Potomac District, Including Grant, Mineral and Tucker Counties of West Virginia

All Seams Except Bakerstown and Waynesburg

	Per Net Ton Run of Mine Coal
Pick mining .....	\$0.902
Machine loading .....	.69
Cutting, shortwall machine .....	.11

#### Bakerstown Seam

Pick mining .....	.96
Machine loading .....	.81
Cutting, shortwall machine .....	.11

#### Waynesburg Seam

Pick mining .....	.96
Machine loading .....	.76
Cutting, shortwall machine .....	.11

#### Kanawha

Machine loading .....	.662
Cutting, shortwall machine .....	.10

#### Logan

Machine loading .....	.572
Cutting, shortwall machine .....	.082

#### Williamson

Machine loading .....	.598
Cutting, shortwall machine .....	.086

#### Big Sandy-Elkhorn

Machine loading .....	.705
Cutting, shortwall machine .....	.11

#### Hazard

Machine loading .....	.642
Cutting, shortwall machine .....	.11

#### Harlan

Machine loading .....	.65
Cutting, shortwall machine .....	.10

#### Virginia

Machine loading .....	.648
Cutting, shortwall machine .....	.097

#### Southern Appalachian

Machine loading .....	.67
Cutting, shortwall machine .....	.11

#### New River

Machine loading .....	.689
Cutting, shortwall machine .....	.105

#### Pocahontas-Tug River

Machine loading .....	.597
Cutting, shortwall machine .....	.075

#### Winding Gulf

Machine loading .....	.624
Cutting, shortwall machine .....	.10

#### Greenbrier

Machine loading .....	.632
Cutting, shortwall machine .....	.085

#### Upper Buchanan

Machine loading .....	.598
Cutting, shortwall machine .....	.086

Cutting rates on track-mounted machines in all districts shall be increased 70 per cent of the amount of increase on short-wall machines.

field, the Hazard district, western Kentucky mines in Ohio and Muhlenberg counties and Virginia. Alabama operators were ready to accept the punitive overtime provisions but balked at an increase in day rates in excess of 30c. Two companies in that State not affiliated with the union continued to work, as did one large producer in southwestern Virginia. Only two operations in the Southern Appalachian field resumed production. Harlan County operators announced wage increases in line with those embodied in the Appalachian contract and non-union production in that field continued.

An agreement covering all but three of the major operations in southwest Virginia was signed April 20 at a meeting in Washington, D. C. This pact follows the provisions of the New York contract as to wages and hours, but has an added clause pledging the union not to give better terms to neighboring competitive fields. According to President Saxton of District 28, two of the three companies—Blue Diamond Coal and Virginia Iron, Coal & Coke—withheld their signatures to the new agreement pending the solution of certain local problems.

Colorado and New Mexico operators were the first to conclude a new district agreement; the contract, based on the increases granted in the New York scale, was signed with District 15 at Denver, Colo., April 4. District agreements for the southern West Virginia fields were signed April 11. Western Pennsylvania and northern West Virginia producers and their district union organizations took similar action the following day.

#### Dual Unions an Issue

Illinois, where the situation is complicated by the existence of two union groups and the demand of District 12 (United Mine Workers) for sole recognition, worked most of the month without formal contracts with the understanding that advances written into new agreements would be retroactive. Spokesmen for the Illinois Coal Operators' Association and District 12 were to resume negotiations at Chicago on April 19; producers who have been operating under contracts with the Progressive Miners were to meet with officials of that union April 20 at Springfield.

District 12's demand for sole recognition has led to the withdrawal of eleven companies from the producers' association and the resignation of W. J. Jenkins, president, Consolidated Coal Co., which has had contracts with both unions, from the presidency of the Illinois Coal Operators' Association. In addition to the Consolidated Coal Co., the list of withdrawals includes: Gillespie Coal Co., Illinois & Indiana Coal Corporation, Mt. Olive & Staunton Coal Co., Pana Coal Co., Penwell Coal Co., Perry Coal Co., Rex Coal Co., Sahara Coal Co., St. Louis Coal Co., and Superior Coal Co.

In the western Kentucky field, where there also are two labor organizations struggling for control, R. M. Nance,

president, Independent Miners' Union, has announced that his group will equal or better any increases which may be granted by operators dealing with the United Mine Workers. The Lewis organization is strongest in Ohio and Muhlenberg counties; the Nance group in Christian, Hopkins and Webster counties.

### On World Inspection Tour

An inspection tour of the principal fuel-technology and chemical-research laboratories of the world is to be made by Dr. H. H. Lowry, director of the Coal Research Laboratory at the Carnegie Institute of Technology, Pittsburgh, Pa., who sailed from New York on April 5 on the "Britannic." He will embark at Yokohama for the United States on July 2.

COMMERCIAL TESTING & ENGINEERING Co. has moved its Chicago offices to larger quarters in the Bell Building, 307 North Michigan Ave.

### Industrial Notes

CARNEGIE-ILLINOIS STEEL CORPORATION announces the retirement of Arthur L. George, manager of sales, Lorain division, from active duty under the pension plan and the appointment of Michael J. Kist as his successor. Mr. George had been employed by the company and its predecessors since 1895. Mr. Kist joined the Lorain Steel Co. in 1903.

LINK-BELT Co., stoker division, has appointed H. F. Brown to manage the sale of its electronic Radiostat control system for eliminating overheating and underheating.

GENERAL ELECTRIC Co. announces the following promotions: H. A. Winne, manager of sales, mining and steel-mill section, industrial department, has joined the engineering department as assistant to Vice-President Muir; his successor is J. J. Huether, formerly manager of sales, machinery manufacturers' section. S. W. Corbin has taken over Mr. Huether's post as manager of the machinery manufacturers' section.

LINCOLN ELECTRIC Co. has appointed Don McCormick as arc-welding consultant for its Kansas City (Mo.) office, 1818 Main St. Mr. McCormick was formerly welding supervisor for the Sheffield Steel Co., of Kansas City. William Sivyver, graduate of the University of Illinois, and B. B. Ross, graduate of Kentucky Wesleyan College have been appointed to the sales staff of the Philadelphia (Pa.) office.

BLAW-KNOX Co., Pittsburgh, Pa., has acquired the property and business of the Power Piping Co., of Pittsburgh, which hereafter will be operated under the name of the Power Piping Corporation.

## LETTERS To The Editor

### Methane Concentration

Referring to page 162 in the April issue of *Coal Age*, I note the statement: "Why he found greater percentages of methane near the roof than near the floor he leaves to the reader."

I do not have time at present to enter into a discussion as to why more methane was found near the roof than near the floor, but if you will refer to Bureau of Mines Technical Paper 190 ("Methane Accumulations from Interrupted Ventilation") you will find charts on pages 15, 19 and 22 which will confirm the findings of A. Nelson, published in *Colliery Guardian*.

From Technical Paper 190 you will notice that the amount of methane at the top increased after the fan was started, and that the difference between the percentages of methane at the top and bottom was greater than when the fan was stopped.

H. I. SMITH  
Chief, Mining Division  
U. S. Geological Survey

### Film Saves Lives

I have just been spending a few days on a special detail to mines in the vicinity of Rosita, Coah., Mexico. While at Rosita I learned of some details of barricading by Mexican miners which might be of interest to your readers and serve again to bring to the attention of the mining public the importance of barricading following a mine disaster rather than of rushing into noxious gases.

On Dec. 22, 1936, a local gas explosion occurred at the Rosita No. 6 mine, which resulted in a considerable number of deaths. Many of the victims were asphyxiated solely because they came out of the protective safe working place into afterdamp. However, there were two instances of successful barricading: One party consisting of seven men barricaded themselves in 4 East entry immediately following the explosion, using brattice cloth and boards, of which there was an ample supply available. They completely walled themselves off from the outside atmosphere and remained five hours behind the barricade until found by rescuers.

On 2 West entry, Sixto Mares and Jesus Guajardo, with six other men, bratticed themselves off for an even longer time until found by the rescue parties. The two last-named men further distinguished themselves by discovering José Huerta, unconscious, some distance outside of the barricade and dragging him in behind the barricade. Due to their thorough barricading, these

fifteen miners, with the exception of Huerta, were able to walk out unassisted when found by the rescue parties. Both parties were fortunate in having brattice men with hammers and nails in their parties.

A point of particular interest to me in connection with this barricading is that ten years before this explosion a Bureau of Mines motion picture illustrating barricading and other safety measures was shown on two consecutive Sundays in Rosita by the operating company (Cia, Carboynifera de Sabinas, S. A.), and the mine superintendent, Mr. J. A. de Silva, stood up and explained the American titles as the pictures were shown. The lesson given from these pictures persisted for a period of ten years and resulted in the saving of fifteen lives.

E. H. DENNY  
District Engineer  
U. S. Bureau of Mines.

### Wood Also Serves

I was very much interested in your editorial entitled "Once for All," in the January, 1937, issue of *Coal Age*. Certainly the "acme of management" would be to protect the roof in main headings by a system that would result first in adequate safety and second at the lowest cost for the period of its useful life.

The work which the Hanna Coal Co. has done in eastern Ohio, starting at the Willow Grove No. 10 mine in January, 1934, has resulted in nearly seven miles of main haulage headings and other important places that have been successfully gunited. The use of concrete in this manner under the conditions in the Hanna mines is apparently an ideal answer in preventing accidents due to roof falls. Lafferty No. 6, Piney Fork No. 1 and Dun Glen No. 11 have had main headings protected in this manner.

There are conditions where acid mine water prevents the economical use of concrete because concrete is essentially an alkaline mixture. There are also conditions where acid mine water prevents the economical use of steel. Under such conditions, pressure-treated wooden timbers have given excellent service.

I have no quarrel with your editorial except to remind you that there are conditions that cannot be successfully met by either concrete or steel, and under these conditions pressure-treated wood is available, and where its use results in adequate safety at a lower cost than other materials it would seem to be good management to proceed along the lines of pressure-treated timber.

A. R. JOYCE  
District Sales Manager  
The Wood Preserving Corporation

# WHAT'S NEW

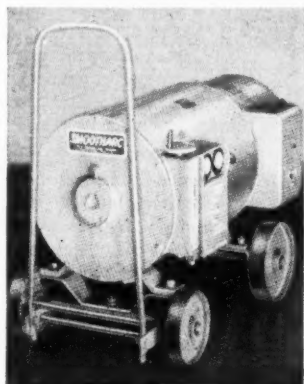
## *In Coal-Mining Equipment*

### SHUNT

A shunt for short-circuiting electric blasting-cap wires said to eliminate the disadvantages of former types without sacrificing the advantages has been developed by E. I. du Pont de Nemours & Co., Wilmington, Del. It consists of a piece of aluminum foil approximately 2½ in. long which is wrapped around the bare ends of the wires, covering both the wires and a portion of the insulation so that there is no possibility of current from any source reaching the bridge wire. This shunt, it is stated, will not shake off while the caps are in transit and is easy to remove, as it is necessary only to spread the wires. Being made of aluminum foil, it will not hurt the user's hands. Tests have shown, the company declares, that the shunt is much more efficient than the older types.

### WELDERS

Harnischfeger Corporation, Milwaukee, Wis., offers a new line of simplified P. & H. Hansen "Smootharc" welders stated to feature single-current control, self-excitation and internal stabilization for fast, steady welding, deep penetration and uniform metal deposit. The new



line is built in two styles: vertically mounted, 75, 100 and 150 amp.; horizontally mounted, 200, 300, 400 and 600 amp. Both models, it is pointed out, are uniformly and compactly built and then are streamlined to eliminate projecting parts and permit easy movement.

### DRIFTER

The new 150-lb. "DA-35" drifter is now offered by the Ingersoll-Rand Co., Phillipsburg, N. J., which recommends it for any heavy-drifting job and characterizes it as the fastest drill ever built by the company. The extra drilling speed and low air consumption, it is stated, have been largely attained by means of a new double-opening di-



rect-flow valve of small diameter, light weight and short travel. The standard "I-R Auto-Feed" can be applied to the DA-35 drill, making it feed automatically in any position and relieving the drill runner of hand cranking. The company recommends the use of "Jackbits" and "Jackrods" with this drill.

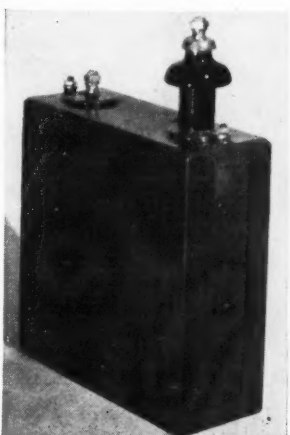
### SWITCHGEAR UNITS; CAPACITORS

A standard line of factory-built metal-inclosed switchgear for shipment as a complete assembly so that cross connections do not have to be made in the field is offered by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This switchgear consists of cubicles in which are mounted



circuit breakers, buses, disconnecting switches, instrument transformers and similar auxiliaries. On the front panels, which are hinged, is mounted desirable relay and metering equipment. The structure illustrated consists of five units, four having solenoid-operated breakers with the mechanism located behind the front panel and the fifth with a manually operated breaker. Disconnecting switches are located in the upper compartment, and are hook-stick operated. The wire glass permits inspection of their position without opening the doors.

Westinghouse also offers a new type weatherproof steel-clad hermetically sealed 15-kva. capacitor unit suitable for pole-mounting on distribution circuits. These units contain an internal-discharge device and are provided with means



for mounting them on brackets on crossarms or directly on poles, or in groups of four on single angle-iron racks, making possible inexpensive installations up to 180 kva. on one pair of crossarms. The capacitors may be connected with the standard form of lightning-arrester protection and with fuse cutouts. The latter may be used to connect and disconnect the capacitor banks from the line.

A new low-cost "Nofuze" panelboard for general 115 and 115/230-volt a.c. distribution with branch circuits ranging from 15 to 50 amp. capacity and selling for approximately two-thirds the price of previous circuit-breaker-type panelboards is another Westinghouse development. Range is 4 to 40 circuits in two circuit steps. Bus arrangements for single-phase, 3/2-wire and 3-phase 4-wire services are provided. Branch circuit ratings of 15, 20, 25, 35 and 50 amp. are available. Box dimensions are 15 in. wide and 4 in. deep.

### SAFETY HAT

Portable Lamp & Equipment Co., Pittsburgh, Pa., now offers a new, lightweight "Cool Hat" bearing the designation "Sentinel." This new protective hat is shaped like a military helmet. It is molded in one solid piece from fracture-resistant fiber and is designed, it is pointed out, to guard the head against injuries and at the same time afford protection against falling or flying objects to the face, ears, neck and shoulders.

### RUBBER COATING

An improved type of plastic rubber of the cold-application self-curing type for use in repairing conveyor belts, lining tanks, etc., with a reduction in shrinkage of approximately 8½ per cent, or about one-third the former figure, is announced by the Self-Vulcanizing Rubber Co., Chicago. Stated advantages include: increased coverage and a thicker finished coating at no increase in cost, as well as, on conveyor belts, longer rubber life and the practical elimination of all strains between the rubber coating or lining and the surface to which it is applied.

The company also announces a new rubberizing compound which requires no

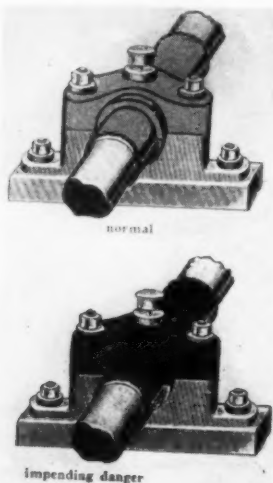
primer before its application to metal or other surfaces for corrosion protection. Known as "Selfvulc Insulator," the new compound is said to incorporate within itself the quality of a primer, making possible application by dipping, spraying or hand brushing with unskilled labor. A steadfast bond in one application is claimed, and additional coats may be added to secure the desired thickness. A vulcanizing time of one hour is all that is required for the first or following coats, it is stated.

#### GRADING UNITS

Simplicity of design and unusually fast and powerful hydraulic blade action are cited as the outstanding features of the new "Bullgrader" and "Bulldozer" units—the first two units in the new tractor-equipment line of the Bucyrus-Erie Co., South Milwaukee, Wis. The Bullgrader is described as a double-purpose unit which can be used both for grading and bulldozing. The blade may be angled quickly to the right or left for continuous side-casting, or it may be set straight across for bulldozing or tilted for filling, terracing or establishing a grade. Both the Bullgrader and Bulldozer, the manufacturer asserts, may be installed on the tractor without drilling, cutting or defacing any part of the tractor frame.

#### HEAT-INDICATING PAINT

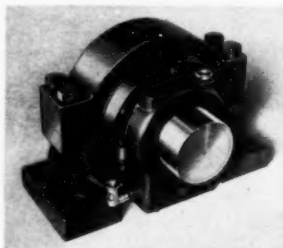
Efkalin Co., New York City, offers a line of heat-indicating paints which change color when exposed to rising temperatures. These paints are



offered by the company for use on processing equipment and power-transmission units, such as bearings, etc. A series of five such paints which change color permanently when exposed to heat are available, along with seven paints which will turn back to the same color from 25 to 50 times when cool. The permanent-change paints are said to change at temperatures ranging from 300 to 734 deg. F., while the retroactive color paints change at from 122 to 464 deg. F., with a safety margin of 25 deg. Efkalin paints, according to the company, are available in both exterior and interior types, both at present good for twelve months' protection.

#### PILLOW BLOCK

A special roller-bearing pillow block for service involving heavy end thrust in addition to radial load is offered by the Fafnir Bearing Co., New Britain, Conn., in shaft sizes from 3 3/8 to 10 in., and with radial load capacities up to 250 tons. In the new pillow block, according to the company, a separate heavy-duty ball bearing to take the thrust loads is included



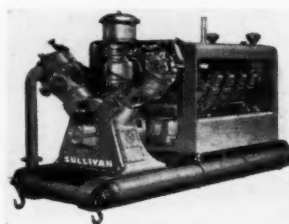
as an integral part of the assembly, giving, it is stated, a definite superiority in capacity and service life over pillow blocks with bronze-plate thrust carriers. Arrangement of the bearings is such that the entire radial load is taken by the roller bearing, while all the forces tending to displace the shaft axially are borne by the ball bearing.

Fafnir also offers a new series of high-capacity ball bearings, described as especially designed to meet the problems of shock loads, vibration and wear growing out of the operation of mining machinery. Using as a basis the single-row radial design, the new bearings are furnished in the heavy-duty series but with specially designed, sturdy, wear-resistant bronze retain-

ers to take care of these extra-duty requirements. As they are strong, dependable and accurately fabricated so that they will be exactly balanced in operation, according to the company, they meet all demands encountered in this field.

#### COMPRESSORS

Sullivan Machinery Co., Michigan City, Ind., offers a new line of "V" vertical air compressors which it states are particularly suited to construction, tunneling and min-



ing applications where air capacities greater than those obtainable from portable units are desired. Known as the WN-102 series, these compressors are available in three sizes rated at 445, 550 and 720 c.f.m. actual air delivery (displacement, 536, 660 and 856 c.f.m.).

The units are of the two-cylinder "V" type, two-stage, double-acting design. Each size is self-contained, it is pointed out, and no water-service connections for cooling are necessary. One of these compressors, it is stated, will prove far more economical than a battery of portable compressors of equivalent capacity. Any type of drive (direct connection, V-belt or flat belt) can be used with diesel or gasoline power units or an electric motor. Either complete units, consisting of compressor and power unit on a skid-type base, or the compressor only can be supplied.

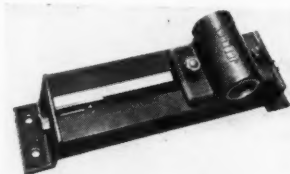
#### WELDING ELECTRODE

Welds with tensile strengths of approximately 100,000 lb. per square inch can be made with the new "Shield-Arc 100" electrode, the Lincoln Electric Co., Cleveland, Ohio, declares. This electrode is a heavily coated electrode of the shielded-arc type designed for welding steels having somewhat higher tensile strengths than those ordinarily welded with "Shield-Arc 85" electrodes. In the as-welded condition, ductility of the welds

is from 12 to 18 per cent elongation in 2 in., both tensile strength and ductility for mild steel. Higher figures are secured by stress relieving. The new electrode is suitable, according to the company, for flat, vertical and overhead welding, and is available in 1/8-, 3/16- and 1/4-in. sizes.

#### SCREW TAKE-UP

A new protected screw take-up for conveyors and elevators is announced by the Jeffrey Manufacturing Co., Columbus, Ohio. The adjusting screw is protected from dust and dirt by an inverted U-shaped shield which extends from end to end of the take-up frame. The sliding base casting, which carries an adjustment nut of bronze, is cored in such a way that it slides freely over the shield, thus relieving the latter of any function other than that of protection. As the adjusting screw does not travel but remains inside the frame, it is protected at all times.



Also, according to the company, the screw is protected from operating strains and shocks and in fact is relieved of all load, as the bearing, after adjustment, is clamped rigidly to the strong steel frame.

#### TIRES

Truck tires designed for severe service where motorized equipment is used to move large quantities of soil and rock are announced by the B. F. Goodrich Rubber Co., Akron, Ohio. The large tires, known as "Earth Movers," will carry a maximum of 15,740 lb. per casing, according to the manufacturer. They are mounted on 13-in. rims, weigh 449 lb. and are available in twelve, sixteen and twenty plies. Four of these tires mounted on one axle will carry 60,000 lb., it is stated. They may be purchased with two types of treads, one for trailer uses on free-moving wheels and the other incorporating a super-traction tread for use in mud and over soft ground.